



# Geophysical Society of Houston

VOL. 33, NO. 2

NEWSLETTER

OCTOBER 1998

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### SHRIMP PEEL OCT. 9

**December 10th at the  
Marriott Westside  
SEG Distinguished Instructor  
Short Course  
Phil Schultz  
"The Siesmic Velocity Model  
as an Interpretation Asset"**

### Membership Alert:

**If the mailing label on this  
issue of your GSH  
Newsletter contains a BLUE  
STRIPE, then the GSH has  
NOT received your 1998-99  
membership dues and this  
will be your LAST newsletter  
issue. To insure  
uninterrupted delivery of  
your GSH newsletter, please  
immediately submit your  
membership dues !!!**

## Technical Sessions for October

The Geophysical Society of Houston is proud to announce the fall SEG Distinguished Lecturer, Dr. Rosemary Knight, presenting "ROCK PHYSICS IN THE REAL WORLD", in two sessions, the GSH Technical Lunch on Tuesday, October 20, and the opening of the Technical Breakfast Committee 1998-1999 season on October 21, 1998. The two locations and times are being offered to insure that all GSH members have the opportunity to benefit from this important presentation.

### Technical Luncheon

Date: Tuesday,  
October 20, 1998

Time: Register and Cash Bar  
11:30 a.m.; Luncheon  
and Talk 12:00 noon

Location: NewHESS 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 Noon on  
Friday, October 16,  
1998

## SEG 1998 FALL DISTINGUISHED LECTURE:

Rosemary Knight received her B.Sc. and M.Sc. in Geological Sciences from Queen's University and a Ph.D. in Geophysics from Stanford University in 1985. She is presently a professor in the Department of Earth and Ocean Sciences at the University of British Columbia. Her principal area of research is rock physics with particular interest in the effect of pore fluids on the electrical and seismic properties of rocks. Another current area of research is the use of ground penetrating radar as a means of characterizing the subsurface. Rosemary was the Distinguished Lecturer for the Canadian Geophysical Union in 1994-95, and with her students has received Honorable Mention for the Best Paper Award at SEG's International Exposition and Annual Meeting for the past two years. In 1995 she was Vice-President of the Near-Surface Geophysics Section of SEG and is now a member of the Editorial Board for the LEADING EDGE.

### "Rock Physics for the Real World"

Geophysical methods are widely used in the earth sciences to obtain information about regions of the subsurface that we cannot directly sample. Determining the way in which the measured geophysical parameters are related to the material properties of interest (e.g. lithology, porosity, fluid content) is the objective of rock physics research. Much of the research to date has focused on understanding the relationship between geophysical properties and material properties in

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**Event Reservations Number: (713) 917-0218**

**email: [reservations@hougeo.org](mailto:reservations@hougeo.org) • website - <http://www.seg.org/sections/gsh/gshhome.html>**

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## GSH Newsletter Due Dates

Issue ..... November 1998  
**Deadline ..... Sept. 17, 1998**

Issue ..... December 1998  
**Deadline .... October 15, 1998**

Issue ..... January 1999  
**Deadline ..... Nov. 19, 1998**

Issue ..... February 1999  
**Deadline ..... Dec. 17, 1998**

Issue ..... March 1999  
**Deadline .... January 21, 1999**

Issue ..... April 1999  
**Deadline .... February 18, 1999**

Issue ..... May 1999  
**Deadline ..... March 18, 1999**

Issue ..... June 1999  
**Deadline ..... April 15, 1999**

*Technical Sessions continued from page 1*

relatively small, homogeneous laboratory samples, under controlled conditions. The critical question is how to best apply these results to the interpretation of geophysical data from large regions of the subsurface - the "real world" - where there are numerous additional complexities associated with the spatial heterogeneity of geologic systems.

Of specific interest in our research are the relationships between elastic wave velocities and electrical properties of porous geological materials, and the level of water saturation. Studies based on laboratory measurements have clearly shown that the lab-scale relationship between elastic or electrical properties and water saturation is highly sensitive to pore-scale and sample-scale fluid distribution. When we consider geophysical field measurements, with a frequency of measurement different from the laboratory and a significantly increased "sample size", we suggest that the

spatial heterogeneity of the subsurface can act in an analogous way to affect the field-scale dependence of our measured parameters on saturation. That is, in order to extract information about fluid content from geophysical data, we first need to account for the heterogeneity within the sampled region. While we can numerically model simple representations of a heterogeneous region of the earth, what we really need is an improved quantitative description of the heterogeneity that actually exists in various geological environments. In parallel with our rock physics research, we are analyzing ground penetrating radar (GPR) images of sediments from various depositional environments. Using geostatistical methods for analysis, we find that these GPR images have well-defined correlation structure, that can be treated as representative of the spatial heterogeneity of the different depositional environments. This provides a way to start incorporating the spatial complexities of the "real world" into our rock physics.

## Technical Breakfast

The special GSH Technical Breakfast will be graciously hosted by Anadarko Petroleum, 17001 Northchase Drive, in the Greenspoint area of north Houston. Access to the building will be available at 7:00 AM, with a complimentary continental breakfast served from 7:00 until 7:45, when Dr. Knight will begin her presentation. A brief question and answer period will follow, with adjournment between 8:45 and 9:00 AM. Free parking will also be provided in the visitors area of Anadarko's parking garage.

Make your reservation with the GSH Business office, at 713.785.6403. The GSH Technical Breakfasts have, to date, always been free of charge for attendance and refreshments due to the generosity of the oil companies which sponsor these events. If you have suggestions or would like to join the GSH Technical Breakfast committee, contact the chairman Scott Sechrist at 281.856.8029 or via e-mail:

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## ACTIVITY REPORT TO THE GEOPHYSICAL SOCIETY OF HOUSTON

Environmental Applications SIG  
— CEC Report September 8, 1998  
submitted by Stephanie Hrabar,  
Liaison to the Citizens Environmental  
Coalition (CEC)

## REGIONAL AIR MONITORING

On June 24th Mayor Brown and County Judge Echols hosted the First Regional Summit on Air Quality at the George R. Brown Convention Center. Stephanie Hrabar was invited to the summit. She attended to find out which non-intrusive geophysical methods were being used to monitor the regional air quality by the city, county (Houston-Galveston Area Council) and industry.

Mayor Brown's goal for the summit was to begin a local dialog on air quality concerns, potential solutions, and to initiate a consensus for the resolution of critical issues (no geophysical methods for measurement specified). Improving the quality of life for all residents while ensuring continued economic stability is a high priority for him. He also outlined a 10-point program for reducing street-level ozone. The Mayor said that if the city is to provide leadership in these matters, it needs to get its house in order first—and he promised to instruct all city departments to review their operations.

County Judge Echols did not state a goal, but said that controls to address air quality issues need to ... "more than merely comply" ... with EPA standards.

*Activity Report continued on page 4*

“They should also promote the physical and economic health of our region.” He offered no commitment by the county to review its operations or to provide leadership in air quality matters, even through the Houston-Galveston Area Council.

During the day about 500 people listened to three panels and keynote speakers. The panelists presented a) specific health and technical problems related to non-compliance and regulations, b) a recent case study that documented that cleaner air was achieved in a large city in California, and the city’s economy prospered and c) some actions to take in this region (none geophysical). The information on public health issues presented by medical doctors seemed to make the most impression on many attendees. The “new” information provided insights into the complex medical and social-economic problems.

In summary, the summit was informative but unbalanced. Specific performance measures for monitoring regional air quality based on non-intrusive geophysical methods was absent.

### **DELEGATE MEETING:**

On July 15th Hrabar attended the CEC Delegate Luncheon meeting hosted by Urban Harvest’s Executive Director, Dr. Bob Randall. The meeting was held at the Urban Harvest office located in the former Dow School Building in Sixth Ward. While delegates from several environmental organizations ate garden fresh fruits and vegetables, Bob gave the history and overview of his organization. Afterwards, he showed slides of the variety of fruits and vegetables being grown in various community gardens. The slide show was followed by a walk through of the 1500 sq. ft. garden at the site. The same one that produced the lunch . . . and without the use of pesticides or herbicides.

In summary Dr. Randall said Urban Harvest provides a systematic approach to learning about land use and community gardens. Community gardens provide a local source of fresh

fruits and vegetables.

### **ENVIRONMENTAL IMPACT:**

Some gardens are a source of fresh produce to local businesses. This provides local businesses with quality products, reduces transportation costs, reduces street-level air pollution, and develops a healthier community.

### **ENVIRONMENTAL INSPECTIONS:**

Tuesday August 25th Stephanie Hrabar participated in the CEC Roundtable titled “ A New Inspection Protocol for Texas”. The meeting took place from 6-8 pm at the new Houston Environmental Center located at 3015 Richmond. The purpose of the informal Roundtable discussion was for representatives of the Texas Natural Resource Conservation Commission (TNRCC) to get feedback from citizens and environmental groups about a proposed change in internal policy for multimedia (air, water, and waste) environmental inspections. Waste includes five major classes of underground injection/disposal wells, petroleum storage tanks, and solid waste landfills.

Panel 1 (proponents) was represented by the TNRCC Field Operations Division: Mr. Carlton Stanley, Regional Manager and Ms Susan Clewis, Field Investigator, Corpus Christi, and Ms Karen Atkinson, Assistant Regional Manager, Houston. Panel 2 (feedback) was represented by Mr. Rick Abraham, Executive Director, Texans United; Ms Carol Alvarado, CEC Board of Trustees; and Dr. Stephanie Hrabar, GSH liaison. A summary and highlights of the roundtable is given below.

### **PROponents:**

TNRCC representatives provided the overview, summary, and conclusions of a 2-year pilot study to develop an Environmental Compliance Management System. The focus of the proposed system is a company’s COMPLIANCE and the TNRCC’s

option to not inspect, or target abbreviated inspections in alternate years for a 5-year period. Participation in the program is voluntary. Strict guidelines must be met for a company to qualify (a very small percentage of companies are expected to qualify).

Five sites in the pilot study belonged to BP Chemicals-Green Lake, Dupont-Laporte, Amoco refinery-Texas City, Dow Freeport and OxyChem-Bayport. All sites are in coastal counties of Texas.

The TNRCC’s proposed system is not related to ISO 14000 (an international standard for environmental management systems.) TNRCC has not set performance criteria and may not use the same criteria as EPA. (The proposal has not been presented to EPA yet.) If EPA accepts the new protocols, Texas could continue to collect Federal grants, while replacing traditional inspections at regulated facilities.

### **FEEDBACK:**

Panel 2 and audience environmentalists were concerned that

- 1) The present and proposed systems are self reporting systems with no significant penalty for non-compliance. Reducing inspections for very few but very large companies that may have grandfathered facilities is not a logical direction to take at this time.
- 2) During the past two years no input was sought from environmental groups, communities adjacent to the facilities, or through public hearings.
- 3) The proposal provides no benefits to the public, such as measurable improvements in regional air quality, fewer emergency room visits for breathing problems, decrease in lung diseases, etc.
- 4) The cost of inspection is paid by the company and not from state revenues, so why decrease frequency of state inspections within a 5-year period? . . . to reduce the cost of inspection to the company . . .to reduce the frequency of exposure to hazardous chemicals to the field inspectors . . . A person

from Dupont provided a handout with graphs showing seven Environmental Performance Key Measures:

- 1) notices of violation
- 2) site production
- 3) environmental cost
- 4) water permit violations
- 5) toxic release inventory releases, TRI
- 6) category B incidents and
- 7) category A incidents (no supporting text and no discussion).

## ENVIRONMENTAL GEOPHYSICS:

Hrabar suggested that the state could monitor regional air and water systems using data from NOAA and possibly NASA. Mr. Stanley from TNRCC was familiar with NOAA. He recalled how the satellite images and internet were used to show the public that the source of very poor air quality all along the Texas coast a few months ago was related to the fires in Mexico and central America.

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## Data Processing SIG

SIG Chair - Karl Schleicher  
(713)782 1234  
Karl@geodev.com

The data processing SIG has planned meetings for the third Wednesday of each month from October through May. We have two speakers each evening with adequate time for questions and discussion after the presentations. Topics and organizers are listed below. Please contact me if you can help organize one of the meetings.

### 10/21/98 Practical experience using depth migration

Organizers: Karl Schleicher, John Anderson

### 11/18/98 Multiples

Organizers: Bee Bednar

### 12/16/98 Converted waves

Organizers: Ilkka Noponen, Chengbin Peng

### 01/20/99 Velocity analysis/estimation for depth migration

Organizers: Side Jin, Second organizer

### 02/17/99 Multi Component Acquisition

Organizers: Bee Bednar, Second organizer

### 03/17/99 Time Lapse Seismic

Organizers: Jozica Gabitzsch, Second organizer

### 04/21/99 AVO

Organizers: Stan Truxillo, Side Jin

### 05/20/99 Prestack Depth Migration

Organizers: Jerry Kapoor, Second organizer

### 09/15/99 Modeling

Organizers: Ilkka Noponen, Second organizer

## OCTOBER MEETING

Date: Wednesday,  
October 21, 1998  
Time: Social 4:30 p.m.  
Presentations 5:00 to  
7:00 pm  
Location: Western Geophysical  
Auditorium 10001  
Richmond Ave  
Houston, TX 77042  
Directions: SW Corner of Briar  
Park and Richmond  
just east of Beltway 8)  
Cost: NO COST  
Topic: Practical experience  
using depth migration  
Speakers: Jacques P Leveille,  
Amerada Hess  
Second speaker to be  
announced at the  
meeting  
Organizers: Karl Schleicher, John  
Anderson  
Title: Depth Imaging, a  
Practitioner's view  
Author: Jacques P Leveille

## Abstract

Depth imaging has become extremely popular in recent years. We present our experience with this technology in 2D and 3D. Pre-stack depth migration in 2D is routinely used for a quick determination of a first pass velocity model, structural control and for AVO screening of prospects. 3D post-stack depth migrations are very efficient and provide a good first look at geologically complex areas near salt or sub-salt. However, the inability to update the velocity model post-stack and the lack of confidence in the actual stack in these complex geological areas makes 3D pre-stack depth imaging our preferred technique. Algorithms have been designed to handle the inevitable compromises that must be made in order to migrate very large data volumes in time to meet real world exploration and production deadlines. Examples are shown of the superior imaging obtained with very large apertures for steep dips and longer offsets for velocity control. Finally, we conclude with our view on the many remaining problems, such as multiples, multi-arrivals, as well as the future directions such as super-long offsets and multi-mode imaging.

### Speakers' Biography:

Jacques P Leveille received a PhD in Theoretical High Energy Physics from Boston University in 1976. He joined Shell Development Company's Bellaire Research Center in 1982 where he worked in many areas of exploration and production geophysics, such as Borehole Geophysics, Shear Logging, AVO, Anisotropy, Wave Propagation and Seismic Imaging. In 1994 he joined Amerada Hess Corporation where he is currently Manager of Exploration Technology.

### Second speaker Abstract and Biography:

A second paper will be announced at the meeting.

## GSH Reservoir Geophysics Seminar

Date: Thursday,  
October 15, 1998

Time: Social 4:30 pm  
Presentation: 5:00 to  
6:30 pm

Location: Bowie Room of HESS  
Building 5430  
Westheimer Road  
Houston, TX 77042  
Call (713) 627-2283 if  
you need more  
directions.

Cost: NONE.

Topic: Seismic Lithology and  
Fluid Imaging

Organizer: Quincy Chen  
Reservoir Geophysics  
SIG Chairman, GSH  
Western Geophysical  
10001 Richmond  
Avenue  
quincy.chen@waii.com  
Tel. (713)689-5778

### Request for audience:

Bring one or two your transparencies/slides to join the speakers for more interactive discussion and analysis.

Speaker 1: Fred Hilterman, Vice  
President Geophysical  
Development  
Corporation

Title: AVO: Are There Any  
New Attributes For  
Reservoir  
Characterization? Are  
They Risk Reducers?

### Abstract:

Reservoir Characterization is touted as the emerging technology that will be the new risk reducer for our industry. Recently, a colleague defined reservoir characterization as "determining a seismic attribute that measures the petrophysical property necessary to produce a reservoir economically". This was expanded upon a bit later when the president of an independent oil company stated that "the process of cracking the code to tie pay to seismic attributes must be reinvented for each field." At the same time, the president mentioned that the

visualization of the attribute must be independent of interpretative bias.

Are AVO attributes these new risk reducers? Is it the "fluid factor", Lamé coefficients, Poisson reflectivity, crossplotting ... what is the primary AVO attribute that characterizes a reservoir? Surprisingly, the successful AVO attribute is often quietly hidden in the available 3D data. What was considered as noise and eliminated in the conventional viewing of 3D seismic is often the key seismic attribute. Several brief case histories will illustrate this principle of unconventional AVO attributes. The case histories include:

- ... Identification and measurement of porosity buildup,
- ... Yegua field development, and
- ... Anisotropic separation of lithology.

The key to using these "new" AVO attributes as risk reducers is the recognition of anomalous seismic expressions and their calibration to the known or estimated rock properties of the reservoirs.

### Biography:

Fred Hilterman is Vice-President of Development at Geophysical Development Corporation, a subsidiary of Geokinetics. His current interests are mainly associated with the calibration of seismic signatures to rock properties. Fred is a member of GSH and SEG.

Speaker 2: Dr. Quincy Chen

Title: Issues in Direct  
Hydrocarbon  
Identification and  
Monitoring

### Abstract:

The current usages of 3D seismic do improve substantially subsurface structure mapping, stratigraphic describing, as well as some lithologic imaging. But seismic detection of fluid zones, content, and other properties remains the most-wanted in exploration and exploitation. The failure and success cases of DHI have brought many issues that are becoming more obvious when costly deepwater exploration and drilling are heating up

in GOM and other areas. Similar issues also come up when reservoir seismic monitoring or 4D seismic is increasingly used for imaging spatial fluid distributing, fluid property variation, and even rock property variation due to rock-fluid equilibration.

In this presentation, several key issues are summarized such as

- a. lithologic v.s. fluid-sensitive seismic attributes
- b. time-domain amplitude v.s. frequency-domain absorption
- c. elastic v.s. viscoelastic synthetic seismic
- d. thick v.s thin-layer attribute anomaly models
- e. prestack v.s. poststack fluid imaging
- f. clastic v.s. carbonate fluid effects

Several case studies and modeling results will be briefly examined to illustrate the points of these issues and directions to resolve them.

### Biography:

Quincy Chen is a senior research geophysicist in the R&D dept. of Western Geophysical. He graduated from Stanford University in 1992 with Ph.D in Geophysics. His interests are mainly reservoir seismic research and software development in particular the seismic attribute technology for direct hydrocarbon identification and time-lapse seismic fluid imaging. Quincy is a member of GSH, SEG, SPE, AGU, and CGS.

Contact: Please contact Quincy Chen for more information about reservoir geophysics SIG seminars in November, December, and next year.





## Technical Note:

### Field Compromises in 3D Design Marc Pottorf , GeoTrace, Denver

We need to consider what really happens when we attempt to acquire a 3D. We can almost never acquire a 3D with the shot and receivers placed where we initially design them. A good 3D design tool will allow you to move the planned shot and receiver locations around while overlaid on a graphic image (either a recent air photo or a topographic map) as shown in Figure 1.

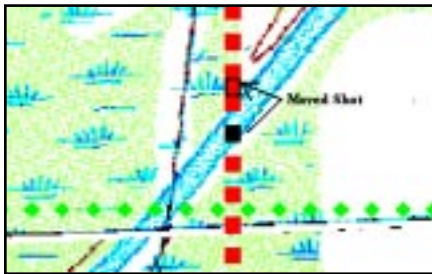


Figure 1

In this case we have a planned shot which fell in a canal and could not be acquired in the original location. There has been a procedure used for many years even with 2D data that a shot should be offset perpendicular to the shot line. With 3D acquisition this procedure has been modified to read "move shots parallel to the receiver lines". Why is this? When a shot is moved perpendicular to the receiver lines in an orthogonal 3D survey as shown in Figure 1, the CDP fold becomes as shown in Figure 2. Note the extensive strips of changes in fold. One set of lines of CDP bins is decreased in fold by one while another set of lines has been increased by one.



Figure 2

On the other hand, if the shot movement follows the rule as shown in Figure 3, the CDP fold becomes what is shown in Figure 4. In this case the only CDP bins affected by the shot movement are at the extreme ends of the receiver line spread. The effect shown will happen only if the location of the receiver template is kept at the same location it would have been placed if the shot had not been moved.

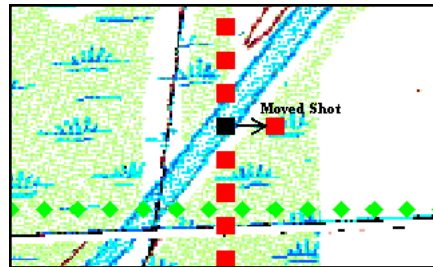


Figure 3

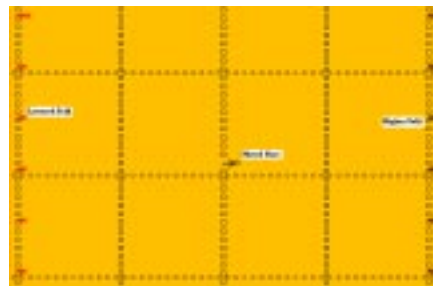


Figure 4

Several field crews recommend that when a shot is moved, the receiver template should be moved the opposite direction an equal amount. Although this method will record some offsets longer than originally planned, it will generate an even CDP fold as shown in Figure 5. If the shot has not been



Figure 5

moved too far the results will keep the same offset and azimuth distribution except for the CDP bins using the receivers at the extreme ends of lines in the receiver template and the CDP bins adjacent to the shot. The best display in order to see the effects are the minimum offset near the shot, Figure 6, and the maximum offset at the far edges of the receiver template, Figure 7.

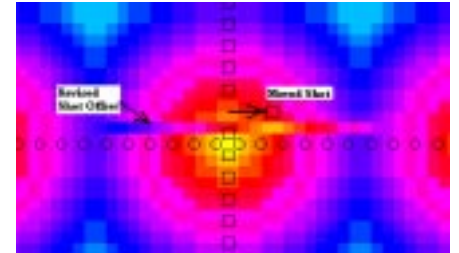


Figure 6

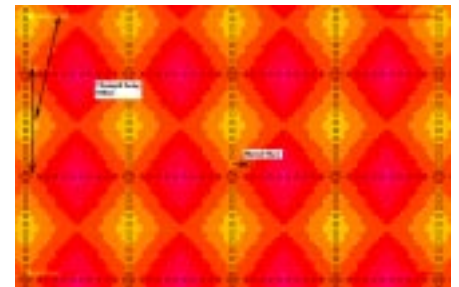




Figure 7



The GSH is soliciting technical notes in this format for future issues. Articles should deal with the science of geophysics as practiced by our members, and be one or two pages in length with figures. Send all articles in ASCII text form to:  
jkozman@seismicexchange.com



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### Upcoming Events:

AAPG / PTTC joint course -  
 "Use of the Internet" -  
 October 17  
 North Harris College  
<http://www.geobyte.com/corsdesc.html>

West Texas Geological  
 Society 1998 Fall  
 Symposium  
 October 28-30

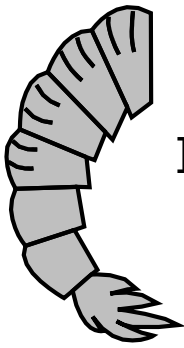
WTGS  
 Fall Core Workshop and  
 Field Conference  
 October 8-11  
 915-683-1573

November Joint GSH/HGS  
 Luncheon  
 November 18th, Hyatt  
 Pat Buckley, "Perils and  
 Pitfalls of 3D Surveys"

Technical Breakfast,  
 November 11, CGG  
 December 9  
 EarthField Technologies,

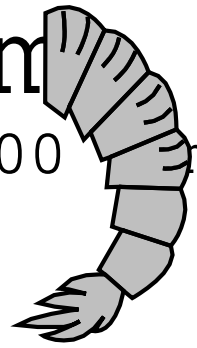
***The GSH Board has decided not to sponsor a Holiday Party this year and is considering a Spring Casino Night - feedback can be directed to Lorinda Driskill (281) 560-1104***





# HGS / GSH Shrimp Pe

Friday October 9, 1998 • 5:00 pm



**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 750 persons only, so purchase tickets early.**

Make checks payable to GSH

Advance purchase by mail until **Friday, October 2, 1998**  
**HGS/GSH Office • 7457 Harwin, Suite 301 • Houston, Texas 77036**  
 (Enclose a self-addressed, stamped envelope)

Advance purchase in person until **Wednesday, October 7, 1998**

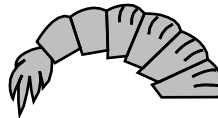
**NO MINORS PLEASE**

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

**North**  
**Rachel White**  
 Mobil E&P US  
 1250 Greenspoint Drive  
 (281) 775-2000

**Downtown**  
**Cheryl Stevens**  
 EPIC Geophysical  
 1331 Lamar, Suite 1331  
 (713) 650-3820

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



**West**  
**Sarah Murphy**  
 LCT, Inc.  
 1155 Dairy Ashford, Suite 500  
 (281) 558-8383

**Event Chairpersons**

**Joe Parker**  
 Geco-Prakla  
 (281) 596-6149

**Tim Hartnett**  
 BHP Petroleum  
 (713) 961-8346



Refreshmen  
 Music  
 Dancing

**GEOPHYSICAL SOCIETY OF HOUSTON**



**13th ANNUAL SPORTING CLAYS TOURNAMENT**

**RESCHEDULED**  
**Saturday**  
**October 24, 1998**

The 13th Annual Shooting Clays Tournament will be held at the American Shooting Centers. Come on out and try the passing dove and springing teal, goose tower and other challenging shots. The tournament will be an all day event and family participation is encouraged.

The tournament will be a 50 bird event and participants will shoot in groups of five (5). Participation is limited to 200 shooters, the sign-up deadline will be extended to October 16. Shells, BBQ lunch and refreshments will be provided. Please bring eye and ear protection.

To enter, complete the form below and mail along with a check payable to: Geophysical Society of Houston

**Mail to: c/o Western Geophysical • P.O. Box 2469 • Houston, Texas 77252-2469**  
**Attn.: Chris Tutt**  
**(713) 689-6804 • Fax: (713) 689-2689**

**CURRENT REGISTRATIONS WILL BE AUTOMATICALLY TRANSFERRED TO THE NEW DATE**

**GEOPHYSICAL SOCIETY OF HOUSTON**  
**13th ANNUAL SPORTING CLAYS TOURNAMENT**  
**NEW DATE: OCTOBER 24, 1998**

NAME: \_\_\_\_\_ TEL: (RES) \_\_\_\_\_ (WRK) \_\_\_\_\_

ADDRESS: \_\_\_\_\_ COMPANY: \_\_\_\_\_

**PREFERRED SHOOTING TIME: (circle one) 8:00 9:45 11:30 1:15**  
**— Please arrive 30 minutes before shooting time —**

.....  
**SHOOTING GROUP (including self)**

- |    |     |     |       |       |
|----|-----|-----|-------|-------|
| 1. | Mr. | Ms. | _____ | 12/20 |
| 2. | Mr. | Ms. | _____ | 12/20 |
| 3. | Mr. | Ms. | _____ | 12/20 |
| 4. | Mr. | Ms. | _____ | 12/20 |
| 5. | Mr. | Ms. | _____ | 12/20 |

(CIRCLE GUN TYPE)

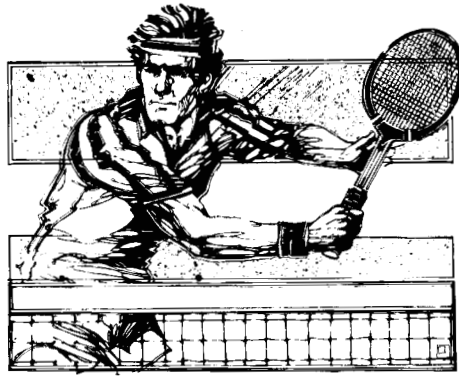


.....  
**GSH/HGS Members or Guest \$58.00**

**DISCLAIMER:**

I acknowledge that neither the Geophysical Society of Houston nor the American Shooting Centers will be held responsible for any injury or accidents during this event. **PRACTICE SAFETY!!**

NAME: \_\_\_\_\_ GUEST: \_\_\_\_\_



## 1998 GSH TENNIS TOURNAMENT

Friday, October 16, 1998 • 12:00 noon  
Chancellors Tennis Club  
\$30.00 per person

Play will begin promptly at 1:00 p.m. and conclude by 5:00 p.m. Lunch will begin serving at 12:00 p.m. and as usual it will be GREAT. Cold drinks will be available and a Keg will be available during the COOLING DOWN TIME. This will be a one half day A and B Scramble Tournament. A player will play with all other players in his group. Ladies will be teamed with partners in the A or B Groups as they choose. In addition to TROPHIES, there will be a drawing for a generous group of DOOR PRIZES. To ensure the proper amount of court space, food and drinks, complete and send in the entry form as soon as possible, but no later than October 12, 1998. We need more players and encourage you to get your associates to participate in this tournament. We are inviting players in the Geological Society to join us this year so as to have more players and more FUN. For information call Bill Steiner 713/789-7250 or Joe Jones 281/438-5626.

### 1998 GSH TENNIS TOURNAMENT ENTRY FORM

Name: \_\_\_\_\_

Company: \_\_\_\_\_

Phone Number: \_\_\_\_\_

Flight preferred: A \_\_\_\_\_ B \_\_\_\_\_ Ladies \_\_\_\_\_

Make check payable to: GSH Tennis Tournament

Mail to: JOE JONES • 3802 Pecan Valley Drive • Missouri City, Texas 77459-4441

# OCTOBER 1998

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
				1	2	3
4	5	6	7	8 WTGS Fall Core Workshop and Field Conference	9 WTGS Fall Core Workshop and Field Conference  GSH/HGS Shrimp Peel	10 WTGS Fall Core Workshop and Field Conference
11 WTGS Fall Core Workshop and Field Conference	12	13	14	15 Reservoir Geophysics Seminar  NEWSLETTER DEADLINE	16  GSH Tennis Tournament	17 AAPG / PTTC joint course - "Use of the Internet"
18	19	20 Technical Luncheon	21 Technical Breakfast  Data Processing SIG	22	23	24  Sporting Clays
25  31	26		27	28 West Texas Geological Society 1998 Fall Symposium	29 West Texas Geological Society 1998 Fall Symposium	30 West Texas Geological Society 1998 Fall Symposium

## GEOPHYSICAL SOCIETY OF HOUSTON

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