Happy 15-year Anniversary!

NSGS Activities at SEG 2008

Seeing as 2008 is the SEG-NSGS’ 15th anniversary, the International Year of Planet Earth, the Electronic Geophysical Year, and SEG 2008 will be held in Las Vegas (one of the thirstiest states in the US) we are paving the path for a strong Near-surface Geophysics presence at SEG 2008. Some of the NSG activities planned for SEG 2008 are:

- **Hydrogeophysics SEG Forum**: The SEG Forum will launch the SEG technical program by providing insight to the future of hydrogeophysics
- **NSG Special Sessions**: We are organizing two special NSG sessions with invited speakers: Hydrogeophysics in Practice and UXO Detection
- **NSGS 15th Anniversary Celebration**: Check in with us for details about our anniversary bash in the next newsletter
- **NSG Technical Sessions**: We expect to receive enough high quality abstracts to have a number of excellent NSG technical sessions

NSGS Goals

To make the NSG technical sessions at the SEG annual meeting a success, we count on our members support by encouraging abstract submittals, reviewing abstracts, and chairing sessions. In addition to your contributions to the SEG annual meeting, we ask that you help us make the NSGS a stronger group by helping us reach our goals of:

- Increasing membership,
- Increasing member involvement in NSG activities and initiatives,
- Re-evaluating the focus of the NSGS,
- Becoming more integrated with the SEG,
- Increasing the number of high quality NSG abstracts submitted to the SEG annual meeting.

NSGS Initiatives
We would like to hear your ideas on how we might be able to reach these goals, and encourage you to provide us with your ideas on the following initiatives:

- Create NSG committees
- Increase call for NSG abstracts and membership to include SEG student sections, NSG academic departments, and other NSG professional societies
- Perform an analysis of our strengths, weaknesses and opportunities and compare to other NSG professional societies
- Convey our strengths and differentiators to the NSG community
- Increase NSGS members of SEG committees

2008 NSGS General Activities

The activities that the NSGS has lined up for you this year are:

- Coordinate NSG technical sessions at SEG annual meeting
- Publish the NSGS quarterly electronic newsletter
- Encourage NSGS members to publish in special issues of journals
- Provide awards and grants
- Organize and lead NSG workshops
- Organize continuing education courses jointly with other societies

We look forward to another 15 years of excellence in near-surface geophysics!

Best regards,

Wendy Wempe
President, Near-Surface Geophysics Section of SEG

Near-Surface Views is going Electronic: Update your email address as necessary

By replacing the printed, snail-mail newsletter with a streamlined, hyperlinked, electronic newsletter, we will be able to direct the saved printing money to providing additional services to our members. This means, however, that we need to be sure to have your correct email addresses on record in order for you to receive the newsletter.

If you haven’t been receiving NSG email blasts, then we likely don’t have your correct email address and you will not be able to receive the electronic newsletter unless you either update your information at My SEG (https://www.eseeg.org/scriptcontent/index.cfm) or provide your correct information to James Irving (NSGS Secretary) (james.d.irving@gmail.com).
The Profiler is an easy to use, lightweight EM system built from the ground up to achieve unsurpassed signal stability.

Using Bluetooth™ technology, the system utilizes a wireless data logger that eliminates noise-inducing cables.

- Geology
- Ground Water
- Archaeology
- Environmental Site Assessment

GSSI team member Dan Delea performing a soil salinity survey in Grand Forks, ND using the GSSI Profiler in conjunction with a Trimble AG 132 GPS system.

Data shows localized zones of high conductivity related to areas of high soil salinity.
# 2008 Calendar of Near-surface Geophysics Events

<table>
<thead>
<tr>
<th>Event</th>
<th>Full Name</th>
<th>Conference Dates</th>
<th>Abstract Deadline</th>
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<td><strong>Conferences</strong></td>
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<tr>
<td>AGU Joint Assembly</td>
<td>American Geophysical Union Joint Assembly</td>
<td>May 27-30</td>
<td>Past</td>
<td>Fort Lauderdale, FL</td>
<td><a href="http://www.agu.org">http://www.agu.org</a></td>
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<tr>
<td>WPGM</td>
<td>AGU Western Pacific Geophysics Meeting</td>
<td>July 29 - August 1</td>
<td>April 16</td>
<td>Cairns, Australia</td>
<td><a href="http://www.agu.org">http://www.agu.org</a></td>
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<tr>
<td>EAGE--Near Surface</td>
<td>European Meeting of Environmental and Engineering Geophysics</td>
<td>September 15-17</td>
<td>April 18</td>
<td>Krakow, Poland</td>
<td><a href="http://www.eage.nl">http://www.eage.nl</a></td>
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<tr>
<td>SEG</td>
<td>Society of Exploration Geophysicists</td>
<td>November 9-14</td>
<td>April 9</td>
<td>Las Vegas, NV</td>
<td><a href="http://meeting.seg.org">http://meeting.seg.org</a></td>
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<td>AGU</td>
<td>American Geophysical Union</td>
<td>December 15-19</td>
<td></td>
<td>San Francisco, CA</td>
<td><a href="http://www.agu.org">http://www.agu.org</a></td>
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<td><strong>Workshops</strong></td>
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<td>SEG Workshop</td>
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<td>May 8-9</td>
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<td>GSA Student Expo</td>
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<td>October 8-9</td>
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<td>Student Job Quest</td>
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<td>TBA</td>
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<td>Lexington, KY</td>
<td><a href="http://www.uky.edu/KGS/esaa/p07/siq.html">http://www.uky.edu/KGS/esaa/p07/siq.html</a></td>
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<tr>
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<td>AAPG/SEG Student Job Fair</td>
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<td>Laramie, WY</td>
<td><a href="http://aapg.ge.uwyo.edu/RockyMtnRendezvous/home.html">http://aapg.ge.uwyo.edu/RockyMtnRendezvous/home.html</a></td>
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EAGE & SEG Hydrogeophysics Special Issue

The European Association of Geoscientists and Engineers (EAGE) and the Society of Exploration Geophysics (SEG) have joined together to create a special issue of EAGE’s journal Near Surface Geophysics dedicated to hydrogeophysics research.

While the abstract deadline is past (March 1, 2008), look for this special issue in the near future. More information can be found at http://nsg.eage.org/

SEG Las Vegas 2008 – Focus on Hydrogeophysics

The NSGS would like to invite you to submit an Expanded Abstract for oral or poster presentation at the 2008 SEG International Exposition and 78th Annual Meeting in Las Vegas, NV, November 9 – 14, 2008. The abstract submission system opens on March 12, 2008 and the deadline is April 9, 2008. Please visit the website (http://meeting.seg.org/techprog/index.shtml) for all abstract submission details, if you have any questions or suggestions please do not hesitate to email Rob Jacob (Robert_Jacob@brown.edu).

There are multiple Near Surface Geophysics events planned for the 2008 SEG meeting, including a shin-dig fit to celebrate the NSGS 15th anniversary.

Contributions from all Near Surface and Environmental Geophysics disciplines and from all parts of the world are desired. We encourage paper submissions which emphasize near surface geophysics applied to groundwater resource evaluation, mine dewatering, environmental characterization, engineering evaluation, seismic and geologic hazards assessment, as well as advancements in borehole, surface and airborne geophysical technologies and processing for near surface applications.

NSGS Meeting at SAGEEP

Each year the NSGS holds a meeting at the annual SAGEEP (Symposium on the Application of Geophysics to Engineering and Environmental Problems) meeting. This year the 21st SAGEEP meeting is in Philadelphia, PA from April 6-10.

The open membership meeting will be:

Sunday, April 6th from 5:00 – 6:00 PM
Conference Room 408-409
Marriott Philadelphia Downtown (Conference Hotel)
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An Old Method of Seismic Reflection Data Collection Within the Urban Environment

Peter J. Hutchinson, Ph.D., PG; Katherine M. Zollinger
The Hutchinson Group, Ltd.

Introduction

A major concern with the collection of seismic data within an urban environment is noise associated with city life. The noise issue is coupled with the deployment of an array of cables that can be destroyed by a careless driver; however, modern systems now use some form of WiFi transmission for data collection and can avoid this setback.

Back in the 1920s and 1930s, seismic records were collected with the shot and receiver at the same location. This form of data is called “single-fold” or 100% data. The hand-drawn response at each location was added to the other collected records to create a seismic profile. Obviously, processing was minimal.

Pan to the year 2008, through digital data collection, multiple records can be collected at the same source and receiver location, which we have termed multi-stacked single-fold data (MSF). We recognized the value of the MSF method several years ago when we were asked to shoot seismic refraction data within a very busy urban environment. Surface waves were a concern; however, “walk-away” surveys show that surface waves impacted the reflection data from between 5 and 10 feet from the source.

A storm sewer line will be tunneled through the Austin Chalk Formation in Austin, Texas for approximately 1 mile. The storm sewer tunnel will cross several areas of suspected Mesozoic-aged faults. The faults are characteristically areas of broken rock and create challenges to the unmanned tunneling tool, which can shut down and must be retrieved from the surface.

Ground penetrating radar, VLF mapping and other methods were abandoned in favor to the MSF method of reflection data collection to determine the locations of the faults.

Geology

A thin veneer of fluvial or Pleistocene-aged sediments unconformably overlie Cretaceous-aged sediments of the Taylor Shale, Austin Chalk, Eagleford Shale, Buda Formation, Georgetown, and Edwards Formation in the Austin area. Borings in the area show that Austin Chalk underlies a thin veneer of Quaternary-aged sediments; however, the conformable Taylor Shale may locally overlay the Austin. Most borings penetrated the underlying Eagleford Shale and some penetrated the top of the Buda.

Post-depositional faulting created a series of normal faults as part of the Mount Bonnell Fault System of the Balcones Escarpment. These Miocene-aged (?) faults show dip-slip displacement of up to 100 feet and are now considered to be quiescent. The Austin Area Plate IV Geologic Map (1992) shows 2 faults, covered by Quaternary alluvium, crossing the area of interest. The seismic program was designed to image these faults and determine if other faults are present.

Methods

The MSF technique involves collection of the event near the source and stacking numerous events to create a single record. Locations for all seismic records were acquired and logged in the field with a Trimble ProXRS DGPS unit.

Data was acquired using one active channel of a Seistronix seismograph and a Mark Products geophone (Mark 40A). Data was recorded at a 1/4-millisecond (ms) sample interval and a record length of 500 ms. Data acquisition utilized a
proprietary method of seismic reflection surveying that employs near vertical ray paths rather than multiple source and receiver stations that have common depth points (CDP). The CDP method sums a collection of recorded traces from common source-receiver offsets to increase the signal to noise level while the MSF method sums a number of vertically acquired traces at a single station to increase the signal to noise ratio.

The system operates by using propane-and-air combustion as a seismic energy source. A small propane bottle was connected to the source; propane gas was injected and exploded in a combustion chamber attached to a shock tube. The expanding gas forms a pressure ridge inside the shock tube that strikes the ground forming an elastic shock wave. A geophone, placed 1 foot away from the base of the seismic source, records the returning reflected elastic energy.

The records were collected in the field and 6 seismically-induced events were collected for each recording location or station. These events were edited and then summed together to increase the signal to noise ratio. This method assumes that all the reflective energy arrives at the same time and thus will be additive, while noise is random and will not be additive.

**Data Collection**

The data was collected at a 35-foot station interval. Individual seismic reflection "picks" of events were made at the first reflection (real event) beneath the source signature.

Velocity was estimated from oil-and-gas well VSPs in the area that range from 4,500 ft/sec to 15,000 ft/sec for the Austin Chalk. Velocity was calculated from the following formula:

\[
v = \frac{d}{t}
\]

where:
- \(v\) = velocity (in ft/sec or m/sec)
- \(d\) = distance traveled (in ft or m)
- \(t\) = travel time (in sec or m/sec)

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\[ V = \frac{2d_1}{t} \]

Where, velocity \((V)\) is a function of the depth \((d_1)\) the 2-way time \((t)\) to the event of interest. Velocity to the event inferred to be the top of bedrock is estimated at 7,500 feet/sec (+100 feet/sec).

**Processing**

The seismic data processing was completed on a microcomputer using WinSeis; a set of commercial data processing algorithms is available from the Kansas Geological Survey. The initial data processing flow was similar to that used to process seismic data in oil and gas exploration with the exception of the algorithms necessary to provide time-variant filtering, migration, and spectral whitening.

**Quality Assurance and Quality Control**

The quality of shallow seismic data acquisition is assured through a walk-away noise test (step-out survey). The walk-away noise test provides assurance that the data acquired are a reflection and not another source of wave energy. This test is conducted by providing a stationary source and by moving a geophone (receiver) at 1-foot increments away from the source to a distance of 10 feet. Ground-roll (the direct surface wave between the source and receiver), moving at a constant velocity, will appear sloped while a real reflector typically appears coherent and flat. Interpretation of the walkaway noise test indicates that a 1-foot geophone offset from the seismic source will allow identification of a reflector that is deeper than 10 ms.
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Discussion

The study area includes roads that parallel the proposed alignment for the construction of the tunnel. Approximately 5,000 feet of seismic reflection profile data were collected that imaged to approximately 450 feet below grade (Figure 1).

The Edwards Limestone is the most dominant reflector and much of the interpretation has been projected from this surface. The Edwards is a clean limestone that is overlain by rocks that provide no well-developed seismic event (i.e., shale, chalk and argillaceous limestone), so the Edwards Limestone is an excellent mapping horizon. The following work is derived from an interpretation of the top of the Edwards Limestone.

![Figure 1. MSF profile collected from south to north along Red River Avenue, showing interpreted faults.](image)

All faults are normal faults with down-to-the-basin throws. Small antithetic faults are present and accommodate the net loss in volume from the down-to-the-basin faults.

Line 1 is approximately 5,000 feet long and was collected south to north along Red River Avenue. The profile starts at Davis Street and ends at the entrance to the hospital across from Waterloo Park. Line 1 is interpreted to have a thick sequence of Quaternary fill near Davis Street that thins rapidly to a thin veneer near record 50, which is the location of an interpreted fault. The Waller Creek Fault crosses this profile at record 18 and has a throw estimated at 75 feet. The seismic profile indicates that the area adjacent to this fault is broken up and tunneling may encounter difficult conditions.

Another fault, the Waterloo Park Splay Fault, crosses this profile at record 49. The Waterloo Park Splay has an estimated throw of 50 feet. At the end of the profile a fault crosses the line at record 125; this fault is called the Waterloo Park Fault. The Waterloo Park Fault has a throw of 60 feet. A small poorly developed antithetic fault to the Waterloo Park Fault is located at approximately record 83. This antithetic fault has no expression in the Austin Chalk, but may cause intense fracturing that can create difficult conditions for the tunneling work (Figure 2).

Conclusion

Defensible seismic reflection data can be collected within an urban setting using a modern version of an age-old method. MSF method can be successfully deployed in an active urban environment to collect seismic reflection data. The MSF method was used along a proposed tunneling alignment in Austin, Texas and shows that faulting in the Cretaceous-aged rocks is present.
One “single-fold” seismic reflection profile was shot (5,280 feet) along Red River Avenue, the tunnel alignment. The velocity of the Austin Chalk was estimated to be approximately 7,500 feet/sec, consistent with VSP data collected in oil-and-gas wells drilled in the vicinity. The interpretation of the seismic profile is also consistent with the published geologic maps. Three predominant (i.e., greater than 50 feet of throw) down-to-the-basin normal faults were mapped and named from west to east; the Waterloo Park Fault, the Waterloo Park Splay Fault, and the Waller Creek Fault. Subsequent to this work, boreholes have confirmed the location of the Waterloo Park Fault that intersects with Red River Avenue to the North.

### References


### Figure 2. Interpretation of subsurface faults superimposed upon the Austin Geologic Map

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### Call For Nominations: Harold Mooney Award

The Harold Mooney Award is presented by the NSG Section during its reception and dinner at the SEG annual meeting. The honoree is chosen by his or her peers through nominations from the membership and recommendation to the NSG Section Executive Committee. The award is presented to an individual in recognition of long-term, tireless, and enthusiastic support of the near-surface geophysics community through education, outreach efforts, professional service, or development of opportunities with other professional disciplines that employ geophysics. For more information see http://nsgs.seg.org/award.htm.

Send nominations to Larry Bentley (NAGS Treasurer) by email (lbentley@ucalgary.ca) or snail mail (Department of Geoscience, University of Calgary, Calgary, Alberta T2N 1N4, Canada). The nomination should contain the name, title and affiliation of the candidate along with a statement describing the reasons for the nomination. Nominations should be received by **Monday September 15, 2008** for full consideration.
THE NSG SECTION

The objectives of the Near-Surface Geophysics Section of the Society of Exploration Geophysicists are as follows:

• to promote the rigorous practice of the science of shallow-earth geophysics including engineering, environmental, groundwater, mining, geothermal and archeological applications,
• to represent that science to public, governmental and other regulatory bodies,
• to encourage fellowship and cooperation among those persons interested in related geophysical methods and problems,
• to support the mutual economic, professional and educational interests of such persons, and
• to foster the development of programs and activities that relate to those interests.

To join or renew your membership with the NSG Section, go to http://seg.org/ and click on “My SEG” or complete the application included in the newsletter.

NEAR-SURFACE VIEWS

Near-Surface Views is published quarterly by the Near-Surface Geophysics Section to convey information of common interest to people working in near-surface geophysics.

To be effective, Near-Surface Views requires the contribution of information from a variety of sources. If you have an item to communicate to other members of the near-surface geophysics community, especially a feature article or photo, please send it to the Editor. All contributions are welcome. The Editor reserves the right to reject items that are felt to be too highly commercial or technically inappropriate.

ALL SUBMISSIONS SHOULD BE SENT DIRECTLY TO THE EDITOR.

New NSGS Committees Need You
By Wendy Wempe, NSGS President

We encourage you to join one of the newly-formed NSGS committees. The new committee goals and respective chairpersons are:

• Advisory Committee: Develop an annual long-range strategic plan for the NSGS and carry out other strategic assessment and planning assignments delegated by the Executive Committee.
  Partha Routh (Partha.s.routh@conocophillips.com)

• Membership Committee: Search out interested, qualified persons and to encourage them to apply for membership.
  Wendy Wempe (wwempe@slb.com)

• Public Relations Committee: Provide information to the public and provide speakers or representatives of the Section to Public Schools, Science Fairs, and other functions as requested by the President. Communicate with SEG Geoscientists Without Borders Committee.
  Robert Jacob (Robert_jacob@brown.edu)

• Inter-Section Liaison Committee: Serve as Liaison Representatives to related technical and professional societies and coordinate cooperation with those societies. Communicate with the SEG Inter-society Relations Committee and SEG Continuing Education.
  Partha Routh (Partha.s.routh@conocophillips.com)

• Honors and Awards Committee: Encourage nominations for the Frank Frishknecht Leadership Award, the Harold Mooney Award, and the NSGS Student Travel Grants, as well as make recommendations to the executive committee for the disposition of the awards and the development of new initiatives. Determine if there are candidates for Honorary Life Membership or for other honor or recognition and to recommend such candidates to the Executive Committee. Communicate with SEG Honors and Awards Committee and SEG Scholarship Committee.
  Larry Bentley (lbentley@ucalgary.ca)
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Advertisements rates are listed below; advertisements run for a minimum of one year and until expressly stopped by the advertiser unless arranged otherwise. For complete advertising information contact the Editor. Current advertisers should notify the editor of any changes by the next issue’s submission deadline.

The submission deadline for the next issue is May 31st, 2008.

2007 Advertising Rates/Issue

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Business Card
$45 (2.0” x 3.75”)

Support Your Near Surface Geophysics Community

There are a number of ways to become more involved and promote near surface geophysics research and activities within the SEG and beyond!

- **SEG 2008 Abstract Reviewers**: Be part of the reviewing process for this year’s abstracts. Contact Robert Jacob (Robert_jacob@brown.edu)
- **SEG 2008 Session Chairpersons**: Help run the sessions by becoming a SEG 2008 chairperson for a NSG session. Contact Robert Jacob (Robert_jacob@brown.edu)
- **SEG booth at AGU**: Spend just a few scheduled hours at the SEG booth at AGU. Contact Candice Chinsetagid at (cchinsetagid@seg.org).
- **SEG Challenge Bowl Questions**: Send Peter Duncan (pduncan@microseismicinc.com) near surface geophysics questions for use in the regional expo and SEG conference Challenge Bowl. The Challenge Bowl is a quiz for geophysics students that tests their knowledge of all aspects of geophysics.
- **NSGS Committees**: Serve on one of the newly developed NSGS committees: Membership Committee, Public Relations Committee, Inter-Section Liaison Committee, Honors and Awards Committee. Contact respective chairpersons named in this newsletter.
- **SEG Committees**: Join one of the many SEG committees. A few we recommend are the SEG Research Committee, SEG Geoscientists Without Borders Committee, SEG Inter-Society Relations Committee, Global Affairs Committee, Student Sections/Academic Liaison Committee. For a complete list, see http://seg.org/publications/yearbook/getCommittees.cfm.

Can You Help a Student attend the SEG Annual Meeting in Las Vegas?

Each year the Near-surface Geophysics Section (NSGS) offers US$500 travel grants to students for attending the SEG Annual Meeting. The purpose of the grants is to raise awareness of near-surface geophysics and to encourage student participation in the SEG Annual Meeting and the NSGS. We need sponsors to help maintain this important program. For a US$500 sponsorship, you will receive acknowledgment at the NSGS annual Section Reception and Business Meeting, acknowledgment in the NSGS quarterly newsletter and the gratitude of an emerging NS geophysicist. If you are interested in helping, contact the chair of the awards committee, Larry Bentley (lbentley@ucalgary.ca).
**Student News**

**Student Travel Grants**

The Near Surface Geophysics Section intends to offer 5 travel grants of US$500 for students to attend the SEG Annual Meeting in Las Vegas (9-14 November, 2008). The awards are meant to encourage and financially aid students in participating in the meeting and presenting their current research as it applies to near surface geophysics issues and problems.

The application procedure can be found at [http://nsgs.seg.org/travelg.htm](http://nsgs.seg.org/travelg.htm) or contact the chair of the awards committee, Larry Bentley (lbentley@ucalgary.ca).

The Call for Abstracts may be found at [http://meeting.seg.org/](http://meeting.seg.org/). If you are not a member of the SEG-NSG Section, please consider joining ([http://nsgs.seg.org/join.htm](http://nsgs.seg.org/join.htm)). NSG Section membership is FREE to students, and SEG membership is not required.

**SEG Foundation’s Zonge Scholarship**

The SEG Foundation announced a graduate student scholarship to honor Kenneth L. Zonge, founder of Zonge Engineering and Research Organization. The scholarship is for students whose research focuses on electrical methods (induced polarization, complex resistivity, etc), and is available by applying through the SEG Foundation’s regular scholarship application forms. The deadline to apply for a 2008-2009 SEG scholarship passed in February.

You can also contribute funds to the Zonge scholarship and help further student research into electrical methods by contacting the SEG Foundation ([foundation@seg.org](mailto:foundation@seg.org)).

**Summer Field Camps**

There are still two summer field camps accepting applications. Both involve field collection, data processing, and data interpretation and presentation. Both of the field camps also have a “deep” and “shallow” component: basin-scale and near-surface scale geophysics. Look at their respective websites and decide which one is for you!

**SAGE**

(Summer of Applied Geophysical Experience)

Application deadline: March 31, 2008


- Runs June 16 - July 11, 2008; based in the Rio Grande Rift, New Mexico
- Employs seismic reflection and refraction, gravity and magnetics, electromagnetics (including magnetotellurics), and electrical resistivity
- Integrates geophysical methods to solve real geological problems of research and practical interest
- Utilizes multi-institutional resources and expertise
- Includes classroom instruction and supporting lectures by academic and industrial professionals
- Open to students outside of CSM and BSU

**Colorado School of Mines (CSM) & Boise State University (BSU) Field Camp**

[http://pal.boisestate.edu/mediawiki/index.php/Field_camp](http://pal.boisestate.edu/mediawiki/index.php/Field_camp)

- Runs May 11 - June 6, 2008; based in the Arkansas Valley, Colorado
- employs seismic reflection and refraction, gravity, and electromagnetics and other geophysical techniques
- Findings used to provide Chaffee County with a better understanding of water resources.
- Data processing and interpretation based at Colorado School of Mines
- Open to students outside of CSM and BSU
DOWNHOLE SEISMIC ARRAY

High-Resolution  Low Noise  Wide Bandwidth

The DHA-6500 is a narrow diameter (38mm) hydrophone array with up to 32 channels. Image shallow structures for engineering, environmental, mining and shallow reservoir applications. Filled with inert silicon oil, the DHA-6500 couples well in fluid-filled holes and includes a unique baffling system to reduce fluid-induced noise.

- Image faults & fractures, stratigraphy, voids, mineral deposits, structures; determine soil, rock and reservoir properties
- Collect better data more efficiently with multi-channel design; each hydrophone is individually isolated to suppress fluid noise
- Uniform diameter - less likely to wedge in hole
- Well suited for downhole, crosshole, VSP and tomography surveys
- Compatible with all seismographs
- Complete systems available with surface & downhole sources, processing software

The DHA-6500 connected to a Geometrics GEODE seismograph
Get two seismic data analysis packages in one!

**Geometrics SeisImager™** suite of software includes the only surface wave inversion program that works with active sources and passive micro-tremors, and also does refraction analysis and tomographic imaging.

Want to solve problems for civil engineers? Want to make better use of your seismic data? Surface wave inversion is a powerful tool that can give you subsurface information in terms that civil engineers can use.

SeisImager/SW automatically inverts complex seismic data into a graph of shear wave velocity vs. depth. Shear wave velocity is directly related to shear strength, so you can immediately estimate the load-bearing properties of the ground and evaluate site classification. SeisImager/2D analyzes refraction data to get a complete wavefield solution.

Use a sledgehammer or weight-drop to generate easy-to-record surface waves on your multi-channel seismograph. SeisImager/SW analyzes the data to determine near-surface shear wave velocities right in the field. For deeper penetration, collect passive micro-tremor events with our unique 2D array that reduces spurious high velocities. Combine the results, stitching the active and passive dispersion curves together to provide a continuous profile over the whole depth range.

SeisImager/2D provides a complete refraction solution, and lets you compare delay time, reciprocal, and tomographic methods. You can even use the surface wave data for a starting model for the refraction inversion.

Integrated surveys require a high-resolution seismograph to collect precision data, instruments like the Geometrics ES-3000, Geode, or StrataVisor NZ.

**Refraction analysis includes first break picker and three different analysis methods.**

The **SeisImager™** software suite is available for other seismographs but works best with Geometrics models.

Contact us for a free demo.

---

**Contact Information:**

2190 Fortune Drive, San Jose, California 95131 USA

Tel: (408) 954-0522 / Email: sales@geometrics.com / Web: www.geometrics.com
Happy 100th Birthday Victor Vacquier!

Victor Vacquier, who, among his many achievements, helped to invent the airborne magnetometer, became a centurion in October. In the 1930s he worked at Gulf Instruments where he created the fluxgate magnetometer, now a staple of geophysical exploration. During WWII, he worked for the Airborne Instruments Laboratory of Columbia University. In collaboration with Navy research, they implemented an airborne version of the magnetometer to detect submarines. Initially, it was mounted on lighter-than-air aircrafts (blimps) which would slowly search an area for a magnetic anomaly (Figure 1). The system was coined the Magnetic Anomaly Detector (MAD) and was eventually mounted onto an airplane, and after the war the system was applied to geologic surveys. This began airborne magnetic mapping industry.

In addition to helping develop airborne magnetometry, Victor has also worked on marine magnetic surveys and heat-flow research at the Scripps Institution of Oceanography. His wide range of accomplishments are too numerous to list here, but for a fuller account visit http://www.mssu.edu/seg-vm/bio_victor_vacquier.html.

Figure 1. A printout from a Magnetic Anomaly Detector (MAD) signal collected from a mid-1950s test exercise of a blimp passing over a submarine. From Larry’s U.S. Navy Airship Picture Book courtesy of Larry Rodrigues (http://battleblimps.com/blimp_book_info.html)

International Year of Planet Earth (IYPE)

The United Nations designated 2008 as the International Year of Planet Earth. Both governments and industries from around the world have donated money for research and outreach centered around the main themes of the IYPE.

Of particular interest to near-surface geophysics are the following research themes:

- **Groundwater**: reservoir for a thirsty planet?
- **Hazards**: minimizing risk, maximizing awareness
- **Earth and Health**: building a safer environment
- **Resources**: sustainable power for sustainable development

For more information, go to http://yearofplanetearth.org
For the GPR Professional
Address any application with a keen eye

The pulseEKKO PRO addresses any GPR application from mineral exploration and glaciology to geotechnical investigations and the examination of concrete structures.

- Unparalleled performance
- Unmatched versatility for near surface mapping
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- Compact and rugged
- Multiple deployment configurations

www.sensoff.ca, sales@sensoff.ca, Tel: (905) 624-8909, International: 800-45-63-45-63
By Larry Bentley, Treasurer

Bank Account Balance

<p>| | |</p>
<table>
<thead>
<tr>
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<td>Balance 1 July, 2006</td>
<td>$23,509.10</td>
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<td>Balance 30 June 2007</td>
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<td>Difference</td>
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July 1, 2006 - June 30, 2007

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<th>Revenue</th>
<th>%</th>
<th>Revenue</th>
<th>%</th>
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<td>Advertising Newsletter</td>
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<td>Sponsorship of annual meeting &amp; banquet</td>
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<td>Student Travel Sponsorships</td>
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<tr>
<td>Misc. SEG payments</td>
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<td><strong>Total Income</strong></td>
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<td>100.0</td>
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<table>
<thead>
<tr>
<th>Expenses</th>
<th>%</th>
<th>Expenses</th>
<th>%</th>
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<tbody>
<tr>
<td>Newsletter Production</td>
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<td>Postage</td>
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<td>Credit Card Fees</td>
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<td>SEG Fees</td>
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<td>Operating Expenses</td>
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<td>Web Construction</td>
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<td>Banquet</td>
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<td>Student Awards</td>
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<td><strong>Total Expenses</strong></td>
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**Net Income-Revenue** **$3602.88**

*Note that the net income does not match the change in bank balance because of outstanding invoices and expenses.

Our main revenue streams are membership dues (31%) and newsletter advertising (41%). However banquet sponsorships and student travel sponsorships were an important 24% of our total revenue. Newsletter and postage account for 30% of our expenses and the banquet 24%. SEG administration fees account for 14%.

In summary, we have a healthy cash base and our revenue is somewhat greater than our expenses, so we are in a position to consider new initiatives.
GPR Systems by GSSI

Geophysical Survey Systems, Inc. (GSSI) is the world leader in the development and manufacture of commercial ground penetrating radar (GPR) systems and electromagnetic induction (EM) instruments. The success of our data acquisition equipment results from having the most versatile GPR systems on the market today.

Field-Rugged Systems with Reliable Results

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• High-resolution, color screens that are easily read in daylight
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• All systems compatible with all GSSI antennas
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September 23-28, 2007
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Near-Surface Geophysics Section of the SEG
Membership Application

The Near-Surface Geophysics (NSG) Section of the Society of Exploration Geophysicists is a professional organization chartered by the SEG to promote the rigorous practice of the science of shallow-earth geophysics. You may read about the origin and goals of the section at http://edge-online.org/pdf/tle1209r0922.pdf and http://nsgs.seg.org/

Class of Membership

- Active Membership¹ $15.00 Includes quarterly newsletter
- Affiliate Membership² $15.00 Includes quarterly newsletter
- Student Membership³ Free Includes quarterly newsletter

Please clearly print or type all entries.

Applicant name: __________________________________ Title: __________________________________

Company/affiliation: ___________________________________________________________________________

Preferred mailing address: _________________________________________________________________________

City: ____________________________ State: ________________ Country: ______________ Postal Code: _______

Telephone: (          ) _______________________________ Fax: (          ) ___________________________

Email: _________________________________________________________________________________________

Primary application/field of study

- Engineering Geophysics
- Environmental Geophysics
- Groundwater Geophysics
- Mining Geophysics
- Petroleum
- Research
- Academic/Training
- Government Admin./Regulations
- Other _______________________

Expertise (check all that apply)

- Borehole geophysics
- Electrical
- Electromagnetics
- Gravity
- Radar
- Radiometry
- Magnetics
- Seismic
- Other _______________________

I am currently a member of the SEG:  _____YES or _____NO. SEG membership is NOT required to join the NSG Section. Note that student SEG membership is free through the Corporate Sponsorship Program. Go to http://www.seg.org, Membership Services, to learn more. If you are not a member of SEG, provide two NSG Section or SEG sponsors or attach a current resume.

Sponsor 1: ___________________________ Company: ___________________________ Email: __________________________

Sponsor 2: ___________________________ Company: ___________________________ Email: __________________________

Payment

Check
I have enclosed my check for $_______ made payable to the “Near-Surface Geophysics Section”

Credit Card
_____ Visa   _____ MasterCard   _____ Amex   _____ Discover   Amount $________

Credit Card Number: ___________________________ Exp. Date: ____/____

Signature (only if paying by credit card)

Please print and complete this form and send with your payment and applicable attachments to the below address.

NSG Section, c/o the Society of Exploration Geophysicists (SEG) Business Office, P.O. Box 702740, Tulsa, OK 74170 USA

¹ Geophysicists & SEG member or sponsored by two NSG Section or SEG members. See NSG Section Bylaws III.1.a. for details.
² Interest in NSG Section & SEG member or sponsored by two NSG Section or SEG members. See Bylaws III.1.b. for details.
³ Registered student. Attach a dated statement signed by a professor in your academic department indicating you are a registered student at the time of application.
⁴ Please include country and city telephone codes, if applicable.