



# Near-Surface Views



Newsletter of the NEAR-SURFACE GEOPHYSICS Section of The Society of Exploration Geophysicists

Third Quarter 2014, Vol. 21, No. 3

## Letter from the President

Dear members of the NSGS,

With this 3rd quarter newsletter, I am nearing the end of my year as President of the NSGS. I will transfer to the position of Past-President during the Annual Meeting in Denver (Oct. 26-31) when John Lane will take over as President. It has been my great pleasure to serve you and the broader NS geophysics community over the past year. In my final President's letter, it is my pleasure to introduce to you three new members of the Executive Committee, announce the winners of two awards, and give you an update on discussions with SEG.



The election for new members of the NSGS Executive Committee has just been concluded. Your 2014-2015 President-Elect is Phil Sirles of Olson Engineering in Denver, Colorado, and the new Editor is Anja Klotzsche of the Forschungszentrum Jülich, Germany. I congratulate both on their election victories. We also welcome Neil Terry of Rutgers University to the ExCom as our new webmaster. I sincerely hope that all three will enjoy a fruitful and positive period serving the NSGS. With both Phil and Anja being elected, we say goodbye to John Bradford (Past-President this year, but President-Elect of SEG next year) and Andy Parsekian (Editor), who both have served the NSGS and its members with great enthusiasm over the past years. They both will be missed.

Thanks to several of you for submitting award nominations for colleagues deserving of recognition for their professional contributions. Out of a group of excellent candidates, the Award Committee has selected two very deserving winners. Professor Jan van der Kruk of Forschungszentrum Jülich, Germany, was chosen as the winner of the Harold B. Mooney Award. Professor Motoyuki Sato of Tohoku University in Sendai, Japan, was selected as the winner of NSGS/EEGS Frank Frischknecht Leadership Award. Both will be present at the Annual Meeting to receive their awards at the NSGS Evening Reception. They will also give a presentation during NSGS Luncheon (for which tickets are still available).

Over the past year the ExCom has continued to work hard for improved NS representation within SEG, allowing for a more coherent home for near-surface geophysicists. It has, however, been a year that has brought quite some surprises and changes of direction. What has not changed is our motivation, which has been to build a stronger near-surface program within SEG. In my last letter dated August 26, I informed you of our planned proposal to the SEG Board of Directors (BoD) for a new-to-form Near-Surface Division. The BoD had many questions with respect to the proposed structure and, unfortunately, did not bring the proposal to a vote. However, the Board did acknowledge the urgent need for changes in order to enable new NS program development, membership growth, and volunteer engagement.

To achieve these goals, a small Task Force has been set up to discuss possible organizational structures, governance models, finances, and program needs. This Task Force, which from NSGS side is led by Peter Annan with Dylan Mikesell and myself as supporting members, has the objective to propose a specific way forward at the October Board of Directors meeting in six weeks. This way forward may use two parallel tracks: a) an immediate focus on the NS strategic plan that was adopted by SEG in 2010 to enhance near-surface programming, and b) a sustainable and repeatable model for special interest group organization within SEG, which may be a longer-term solution.

Of course, I had hoped to bring you a more conclusive result of a year filled with negotiations and discussions. However, after speaking at the August BoD meeting and communicating with the new Task Force, I have no doubt that the SEG Board's intentions are sincere, which is to build a strong home for NS geophysics at SEG. With John Lane and Phil Sirles coming in as President and President-Elect, we have strong team to focus on NS programs and member services. The Task Force will plug away in the background on less exciting things like governance and finances.

To close, on the following pages of this newsletter, you will find some more exciting content. There is an SEG Student Chapter update from the Institut National de la Recherche Scientifique (Quebec, Canada), with a description of various recent projects. Also, we have a feature article on USGS geophysicist Burke Minsley, who was recently awarded the very prestigious Presidential Early Career Award for Scientists and Engineers (PECASE). You can catch Burke at the Annual Meeting in Denver where he will give an invited presentation during the AGU-SEG Hydrogeophysics session. On the following pages, you can find details on the Annual Meeting, including the technical program, NSGS business meeting, social events (luncheon and reception), and last but not least, four deserving winners of NSGS student travel grants.

It has been my pleasure to serve you and the community this past year. I hope to see many of you at the Annual Meeting in Denver.

Best regards,

Remke Van Dam  
rvd@msu.edu

## Feature Article:

# Burke Minsley Becomes First Near-Surface Geophysicist to Win PCASE Award

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Citation by: Dylan Mikesell

During recent ceremony at the White house in Washington D.C. on April 14, 2014, Dr. Burke Minsley was awarded the 2012 Presidential Early Career Award for Scientists and Engineers (PECASE). Burke is a Research Geophysicist at the USGS in Lakewood, CO, and is the first near-surface geophysicist to receive this prestigious award. The NSGS wishes to congratulate Burke on this impressive distinction and his achievements in near-surface geophysics. The PECASE [award](#) is the highest recognition granted by the United States government to scientists and engineers in the early stages of their research careers.

"The impressive achievements of these early-stage scientists and engineers are promising indicators of even greater successes ahead," President Obama said in a White House press release announcing the awardees. "We are grateful for their commitment to generating the scientific and technical advancements that will ensure America's global leadership for many years to come."

A [USGS press release](#) gives more details on the award and Dr. Minsley's work:

### Award Background

Each year, ten federal departments and agencies join together to nominate outstanding scientists and engineers whose discoveries and advancements expand the horizons of science and technology, contribute to their agencies' missions, and benefit America's economy and the health and safety of the nation's people.

The awards, established by President Clinton in 1996, are coordinated by the Office of Science and Technology Policy within the Executive Office of the President. Awardees are selected for their pursuit of innovative research at the frontiers of science and technology and their commitment to community service as demonstrated through scientific leadership, public education, or community outreach.

### Dr. Burke Minsley

***Presidential Citation: "For his fundamental research on advancing airborne electromagnetic survey methodology and its application to describe the extent and dynamic state of permafrost during a time of changing climate and his mentoring of undergraduate and graduate students."***

As part of an interdisciplinary team of scientists developing applications of airborne electromagnetic methods for a variety of mission-oriented studies, Burke Minsley's work has significantly placed the USGS as a leader in scientific studies of permafrost terrains. Minsley uses remotely sensed airborne geophysical data to provide detailed new information about the earth's subsurface, where few details are available, but which is host to critical geological and environmental variables related to groundwater, mineral resources, infrastructure, and permafrost.

His work has involved the development of new computational tools for uncertainty quantification that redefine how geophysical information is communicated to geologists, hydrologists, and other stakeholders. For example, his research has resulted in significant advances in calibration of airborne electromagnetic (AEM) surveys and application of earth imaging algorithms. These advances have resulted in significant contributions to USGS groundwater studies that use both geophysical and hydrologic modeling. His work exemplifies the team approach to integrated science studies, particularly in the challenging area of mapping permafrost. In addition to permafrost studies, Minsley's new processing and inversion algorithms



have hydrological applications for investigations at the watershed scale to address emerging water resource management issues.

"Burke has made significant contributions in the challenging realm of geophysical and hydrologic modeling," said Trude Ridley, center director for the USGS Crustal Geophysics and Geochemistry Science Center in Denver. "His integrated science approach, particularly in the application of airborne electromagnetic methods, has resulted in a better understanding of the shallow subsurface environment."

One of his 2012 permafrost publications was an Editor's Choice article in Science Magazine, with the editor noting that the research not only provides a baseline for future studies on permafrost, but also reveals "important details about potential connections between surface and groundwaters and the evolution of the permafrost over the past 1,000 years."

Minsley began his studies with a B.S. in Applied Physics at Purdue University, followed by a five-year stint on seismic exploration vessels that solidified his interests in geophysics before completing a Ph.D. in Geophysics at the Massachusetts Institute of Technology.

Burke will be presenting an invited talk at the SEG annual meeting titled: "Modeling the hydrogeophysical response of lake talik evolution" on Wednesday Oct. 29<sup>th</sup> at 9:20am (room 4B) in the session SS4: AGU-SEG Hydrogeophysics.

USGS Article: <http://www.usgs.gov/newsroom/article.asp?ID=3867#.VBdc1y5dX7C>

White House Article: <http://www.whitehouse.gov/the-press-office/2013/12/23/president-obama-honors-outstanding-early-career-scientists>

At the geophysical and geostatistical lab (<http://www.liamg.ca>) of Institut National de la Recherche Scientifique (INRS) we focus on three-dimensional geological modeling based on multiple scale geophysical data assimilation and stochastic optimization. The current ongoing projects concerns reservoir modeling for hydrogeological, geothermal, oil and gas and CO2 sequestration purposes, UXO localization, passive seismic and deep geophysical prospecting.

Talking more specifically on environmental projects, the ongoing research goes from theoretical developments to data acquisition, analysis and interpretation, statistical data integration and flow and transport modeling. In the last five years, we conducted several projects ranging from the local scale (several meters), to sub-watershed (several km<sup>2</sup>) to regional scale (9000 km<sup>2</sup>). In the next sections, we present some of these projects based on different types of data integration.

## St-Lambert Project

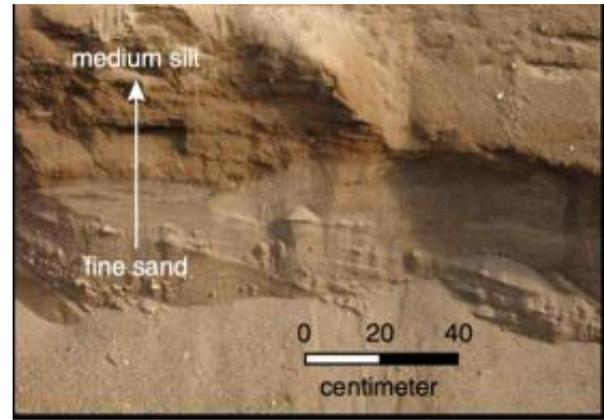
Providing a sound basis for aquifer management or remediation requires that hydrogeological investigations carried out to understand groundwater flow and transport be based on representative data that capture the heterogeneous spatial distribution of aquifer hydraulic properties. At INRS, we combine geophysical data with conventional characterization tools (e.g. borehole logs, pumping tests, ...) to efficiently build hydrogeological models reproducing this heterogeneity.

The St-Lambert project shows the general workflow that is developed at INRS to built multiple hydraulic conductivity scenarios (K) on a granular aquifer at an intermediate scale of a few km<sup>2</sup>. The study site is a decommissioned sanitary landfill where assessment of the migration and natural attenuation of a leachate plume is needed.

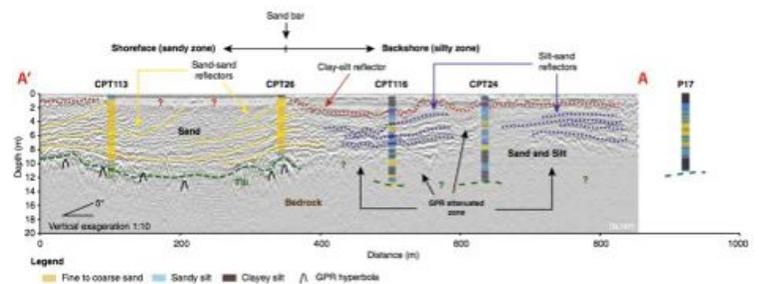
1- The sediments composing the aquifer were deposited in a littoral-sublittoral environment and show evidence of small-scale transitional heterogeneities (Figure 1). The superposition of sand and silt layers are believed to create semi-confined aquifer conditions due to their respective hydraulic conductivity contrast.

2- Ground penetrating radar (GPR) surveys were chosen as a tool to characterize the aquifer architecture in complement to the regional geology. Typically, reflection amplitudes can be correlated to the contrasts between different sediment grain sizes and can be used to identify zones with different hydrogeological conditions. Approximately 21 km of GPR surveys were acquired over the study area to identify bounding surfaces and the geometry of internal structures within the aquifer (Figure 2 and 3).

3- On the basis of previously recognized GPR-facies, 53 Cone penetrating tests (CPT) soundings were located to allow further geological interpretation of the GPR surveys and to acquire collocated mechanical and electrical properties of sediments. Based on CPT data obtained in real-time during sounding operations, 25 of the 53 direct-push sounding sites were selected for the installation of observation wells to be



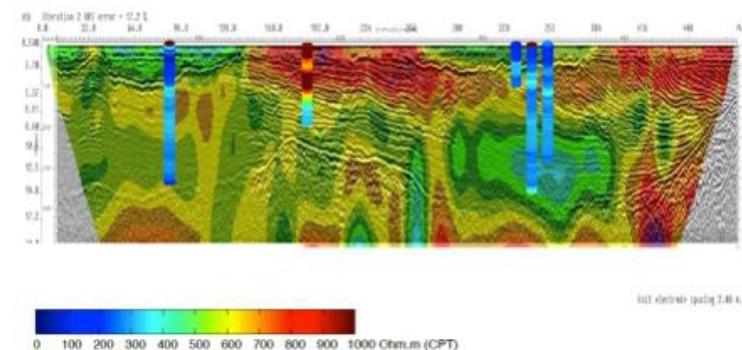
**Figure 1** Photo of sediments showing rapid vertical transition dry sand beds upward into damp silt beds.



**Figure 2** Interpreted GPR profile showing the exceptional quality of the results at St-Lambert.



**Figure 3** A demonstration of our GPR homemade sled to undergraduate students at St-Lambert.



**Figure 4.** Collocated of ERT, CPT and GPR data

used, among other things, to carry out hydraulic tests collocated with the CPT physical measurements.

4- More than 8 km of electrical resistivity tomography (ERT) profiles were acquired to confirm the continuity observed on the CPT resistivity (Figure 4 and 5). Those surveys allowed the identification of contaminated zones and were used to complement the geological interpretation of the GPR profiles.

5- A learning machine approach was used to obtain the complex statistical relationships between co-located hydraulic and CPT/SMR data to obtain hydraulic properties on the full range of aquifer materials investigated by direct push measurements.

6- To obtain plausible heterogeneous 3D models for hydrogeological parameters, surface geophysical measurement, direct push measurement and the geological information were integrated using geostatistical simulations. This was computed by Bayesian simulation of the hydrogeological properties using the geophysical parameters as the secondary variable (Figure 6).

### Montérégie project

Conventional regional geological numerical modeling (several thousand of  $\text{Km}^2$ ) generally consists in interpolating by hand the different units intercepted at sampled wells and guided by the geological knowledge of the model builder. However, the lateral distribution of the geological units is not well represented by the discrete information of the geology measured at some sparse wells. In this project, we propose a more quantitative and reproducible workflow of the subsurface geological modeling by integrating multiple 2D indirect geophysical measurements and well data.

1- Data from engineering consultants and different governmental databases were first gathered. From all the available data, the boreholes with the lithological description we had the greatest confidence in were kept for this project.

2- CPT and Rotopercussion soundings (RPSS) were used to obtain confident information of the stratigraphic sequence and bedrock depth to filter existing well information and to validate and assist geophysical interpretation.

3- About 100 km of reflection seismic lines were acquired. The system used consists in a 48 channels, three components landstreamer developed and operated by the Geological Survey of Canada. The reflection seismic profiles in Eastern Montérégie were a crucial and determinant information that permit defining internal structure of unconsolidated sediments down to the till and bedrock interfaces.

4- Subsurface materials in Eastern Montérégie present noticeable variation in electrical resistivity. For this reason, we also used the Time-Domain Electromagnetic method (TDEM) to measure vertical profile of the resistivity in the interval of 5 to 50 meters without requiring any contact with the ground. It allows very dense profile acquisition to generate pseudo-2D resistivity lines (Figure 8).



Figure 5 The geophysics team, waiting on the Syscal Pro to do the job.

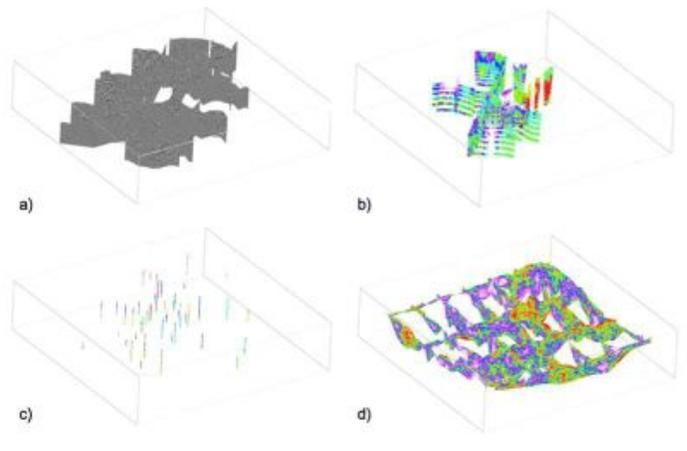


Figure 6 Figures showing the process of the integration of geophysical data. With the help of the GPR profiles (a) and the ERT surveys (b), the hydraulic conductivity  $K$  at the CPT location (c) are integrated using co-simulation. One realization of  $K$  is shown in (d), where semi-confined layers can be seen. The color scales are in relative units.

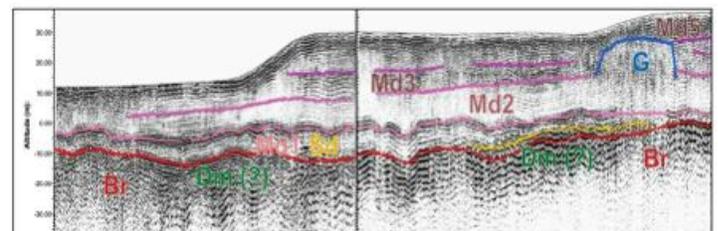


Figure 7 An example of an interpreted S-wave seismic reflection profile acquired in the Montérégie project.

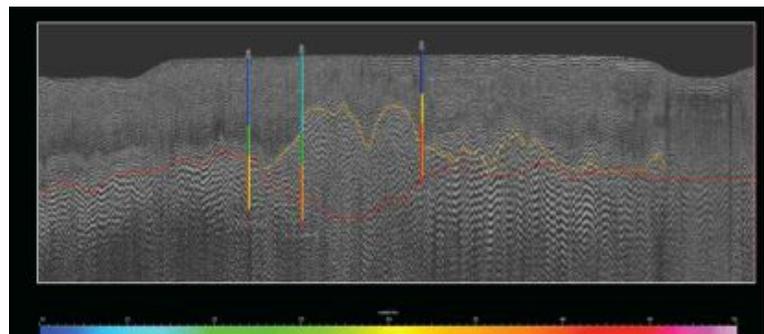


Figure 8 A comparison between results of TDEM and a seismic profile.

5- Finally, ERT was used to obtain high-resolution electrical resistivity profiles of specifically aimed features such as delineation of saline groundwater extent or discrete sandy units like eskers where TDEM and seismic systems were not deployable (Figure 9).

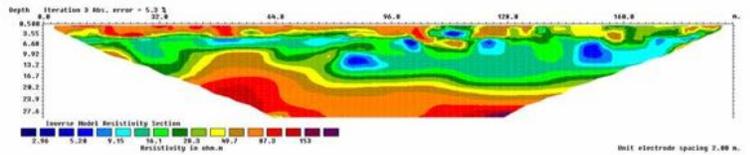


Figure 9 ERT example of the Montérégie project.

6- In order to generate a 3D geological model, surfaces representing transition between petro-physical units were constructed. The elevation of those surfaces is constrained by the geological and all the geophysical information. In order to integrate all the data with their intrinsic resolution we used kriging with external drift in combination with discrete smooth interpolator. Once the delineating surfaces are built, each unit volume was generated to build a stratigraphic sequence (Figure 10).

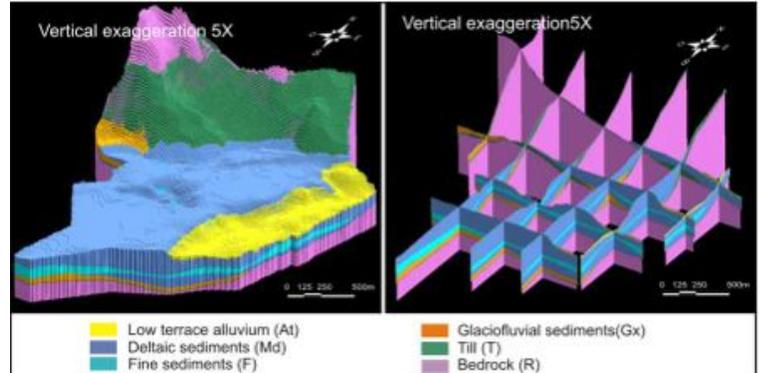


Figure 10 An example of a 3D geological model.

7- Finally, multiple facies and K models are generated by combining well and geological data of Figure 10 using discrete (multiple point simulation in this case) and sequential Gaussian simulations (Figure 11).

We thank the Near-Surface Geophysics Section of SEG for the opportunity to communicate some of the ongoing research project at the geophysical and geostatistical lab of INRS. For more details on our research group, visit our web site at <http://www.liamg.ca>.

# SEG NSGS Election Results

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*Congratulations to our new Executive Committee Members!*

We are pleased to announce the winners of the NSGS executive committee elections. **Phil Sirles** will join as the President-Elect and **Anja Klotzsche** will join as the Editor.

**Phil Sirles** is the Principal Geophysicist with Olson Engineering in Denver, Colorado. He holds a BS in Geology and MS in Geophysics from Mackay School of Mines/University of Nevada-Reno. Both his undergraduate and graduate degrees had significant emphasis on engineering; as a result, he has spent the majority of his career assisting geotechnical and civil engineers with applied geophysical approaches for near-surface solutions to geologic and engineering problems. Phil started his career with the government, where he spent over 10 years at the Bureau of Reclamation in Denver, but he shifted to industry in the late 1990s. Practicing as a geophysics service provider for 18 years, the breadth of his career includes projects for assessment of critical facilities worldwide (e.g., dams, levees, power plants, airports, etc.), environmental clean-up, and groundwater resource evaluation.

Phil's motivation has not only been to supply the engineering community with practical and affordable alternatives to drill-baby-drill, which we all know is the be-all-and-end-all for design engineers, but also to reach out continually to professionals with both research and training needs. Since 2003, Phil spearheaded a determined effort by the Federal Highways Administration Central Federal Lands Highway Division (FHWA-CFLHD) to promote near-surface geophysical practices to the forefront for use by transportation engineers and geologists. The effort started with a 740-page manual, followed by the development of the print manual into a fully interactive technical website ([www.cflhd.gov/resources/agm/](http://www.cflhd.gov/resources/agm/)) built entirely on particular engineering problems and their solutions. The website was so well received by FHWA Headquarters that it was then followed by years of on-site training and short courses to regional and divisional FHWA offices, and included every State Department of Transportation. As time, travel, and funding became issues, the CFLHD chose to create an 8-hr., 3-DVD set of educational materials entitled Geophysical Engineering for Transportation Projects (with training sessions on Seismic, Electrical, GPR, EM and Mag). The DVDs are now available from CFLHD for all DOTs and FHWA engineers and geologists. Phil believes that if the benefits and limitations of near-surface geophysical applications are equally understood by the end user, the near-surface geophysics community as a whole expands. Phil was the project manager for each of these FHWA efforts, and he feels that, of the many field projects he has completed during his career, this 10-year effort with FHWA was the most rewarding.

**Anja Klotzsche** received a master's degree in Applied Geophysics in 2009 in a Joint Master Program of the TU Delft (Netherlands), ETH Zurich (Switzerland) and RWTH Aachen (Germany). In 2013 she obtained a PhD in Hydrogeophysics from the RWTH Aachen (Germany) and was working as a research assistant in the Agrosphere, Institute of Bio- and Geosciences at Forschungszentrum Jülich, Germany from 2009 to 2013. Since February 2013, she has been working at the same institute as a postdoctoral researcher. In 2011 and 2012 she spent three months as a guest scientist at the Boise State University (Idaho, USA). Her work was twice awarded with the Young Scientist Best Paper Award 2010 at the XIII International Conference on Ground Penetrating Radar, and 2012 at the 14th International Conference on Ground Penetrating Radar. She is the author/co-author of 16 international journals and conference proceedings. She acted as a reviewer for several international journals, was a member of the Scientific Review Panel of the 15th International Conference on GPR 2014 in Brussels, and was also a chairwoman at this conference. Her main research activity is focused on hydrogeophysics and GPR full-waveform inversion for borehole and surface data.

## Congratulations to NSGS Award Winners

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### Harold B. Mooney Award winner - Jan van der Kruk

Congratulations to Professor Jan van der Kruk, of Forschungszentrum Juelich GmbH, Germany, for having been selected for the 2014 Harold B. Mooney Award.

The award will be officially presented during the NSGS Reception at the upcoming SEG Annual Meeting. Prof. van der Kruk will also give a presentation during the Near Surface Geophysics Luncheon at the Annual Meeting. For details on the timing of these events see elsewhere in this newsletter.

The following is the congratulatory letter of NSGS President Remke Van Dam to Professor van der Kruk:

*Dear Dr. van der Kruk,*

*It is with great pleasure that I can inform you that you were selected by the Award Committee of the Near Surface Geophysics Section (NSGS) of the Society of Exploration Geophysicists as the winner of the 2014 Harold B. Mooney Award.*

*As you know, the Harold B. Mooney Award is annually given to an individual in recognition of scientific and technical excellence and innovation leading to the advancement of near-surface geophysics and 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.*

*Over the years, your service to the near-surface geophysics community in general, and those at SEG and NSGS in particular has been exemplary. You have organized and conducted many topical sessions and workshops, have served on conference organizing committees, and have been instrumental in helping to establish near-surface geophysics as one of SEG's current priorities. In addition to your tireless efforts to promote near-surface geophysics and serve the community, you are a geophysicist of the highest caliber with important advances in GPR full-waveform inversion and hydrogeophysics.*

*The NSGS is very happy to call you the deserving winner of its 2014 Harold B. Mooney Award.*

*Sincerely,*

*Remke Van Dam  
2013-2014 NSGS President*

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### Frank Frischknecht Leadership Award Winner - Motoyuki Sato

Congratulations to Professor Motoyuki Sato of Tohoku University, Sendai, Japan, for having been selected for the 2014 NSGS/EEGS Frank Frischknecht Leadership Award.

The award will be officially presented during the NSGS Reception at the upcoming SEG Annual Meeting. Prof. Sato will also give a presentation during the Near Surface Geophysics Luncheon at the Annual Meeting. For details on the timing of these events see elsewhere in this newsletter.

The following is the congratulatory letter of NSGS President Remke Van Dam to Professor Sato:

*Dear Prof. Sato,*

*It is with great pleasure that I can inform you that you were selected by the Award Committee of the Near Surface Geophysics Section (NSGS) of the Society of Exploration Geophysicists (SEG) as the winner of the 2014 Frank Frischknecht Leadership Award.*

*The Frank Frischknecht Leadership Award is jointly presented by the NSGS and the Environmental and Engineering Geophysical Society (EEGS). The Frank Frischknecht Leadership Award is established to recognize an individual who shows extraordinary leadership in advancing the cause of near-surface geophysics through long-term, tireless, and enthusiastic support of the near-surface geophysics community. Such leadership is often boldly displayed by an invention, a new methodology or technique, a theoretical or conceptual advancement, or a unique innovation that transforms the nature and capabilities of near surface geophysics.*

*The Award Committee lauds your sustained and important contributions to near-surface geophysics in the field of ground-penetrating radar. Specifically, the committee recognizes your accomplishments in the development of polarimetric borehole radar techniques, directional receiving antennas, and slim-hole logging sondes; applications of airborne and ground-based SAR for environmental assessment and monitoring; and the use of ground-penetrating radar for humanitarian work, including for demining and tsunami relief efforts.*

*The NSGS and EEGS are therefore very happy to call you the deserving winner of their 2014 Frank Frischknecht Leadership Award.*

*Sincerely,*

*Remke Van Dam  
2013-2014 NSGS President*

## 2014 SEG Annual Meeting - Sessions and Events

NS was given two oral sessions, one 'mini' oral session (ePoster), and one traditional poster session. In addition, we have the SEG/AGU standing session on Hydrogeophysics. Each session has 8 presentations, for a total of 40 accepted papers, including the hydrogeophysics session.



### Session Details:

#### **Surface-Waves (Oral Session) Monday PM; Room 4B**

Rick Miller - Kansas Geological Survey  
Valentina Socco - Politecnico di Torino - DIATI

#### **Reflection, Tomography, Interferometry and Statics (Oral Session) Tuesday AM; Room 4B**

Seth Haines - US Geological Survey  
Said Mahrooqi - Petroleum Development Oman - PDO

#### **Standing Session 4: Hydrogeophysics Wednesday AM; Room 4B**

Kristina Keating - Rutgers University  
Ryan Swanson - Colorado School of Mines

#### **Integrated Methods, Joint Inversion, ERT/EM, and Hazards (Eposter) Tuesday PM; Room 404**

John Bradford - Boise State Univ.  
Louise Pellerin - Green Geophysics

#### **NS Developments and Applications (Poster session) Wednesday PM; Poster Venue Area**

John Lane - US Geological Survey  
Julian Ivanov - Kansas Geological Survey

*NOTE: Talks in the oral and e-poster sessions will be 25 minutes long, including 5 minutes for questions and transition to the next presentation.*

#### **NSGS Travel Grant Award Winners**

NSGS received 14 high quality applications for its Student Travel Grant Program. After careful review of the applications, we selected the four winners listed below. We will present these students with their winner's checks during the NSGS evening reception on Tuesday October 28, starting at 7PM in the Katie Mullen's Irish Restaurant and Pub in Denver.

**Rotimi Akinwale**, University of Lagos, Nigeria  
"Integration of Borehole Logs and 2D Electrical Resistivity Imaging in the Investigation of Saltwater Intrusion in Lagos Island, Southwestern Nigeria"  
Session NS Posters1, Wednesday October 28, 4:25pm

**Gabe Gribler**, Boise State University, USA  
"Some benefits of multicomponent land seismic streamer data on a road surface for surface and body wave analysis"  
Session NS1, Monday October 27, 3:35pm

**Yue Wang**, University of Science and Technology of China  
"Pseudo 2D elastic waveform inversion for Q factor in the near surface"  
Session NS1, Monday October 27, 3:10pm

**Chao Zhang**, University of Science and Technology of China  
"Refraction interferometry for residual statics solutions"  
Session NS2, Tuesday October 28, 8:55am

## Social Events at the SEG annual meeting

Near Surface Geophysics Luncheon

Date: Tuesday, 28 October, 11:00 a.m.-1:30 p.m.

Location: Colorado Convention Center

Near Surface Coordinator: Remke Van Dam

Guest Speakers: Professor Jan van der Kruk, *2014 Harold B. Mooney Award winner*

Professor Motoyuki Sato, *2014 Frank Frischknecht Leadership Award winner*

Near Surface Geophysics Section Business Meeting

Date: Tuesday, 28 October, 4:00 a.m.-6:00 p.m.

Location: Colorado Convention Center

Near-Surface Geophysics Section Reception

Date: Tuesday, 28 October, 7:00 pm-11:00 pm

Location: Katie Mullen's Irish Restaurant and Pub in the Sheraton Hotel, 16th Street Mall, Denver

Events: Student Travel Award presentations; Harold B. Mooney Award presentation; Frank Frischknecht Leadership Award presentation

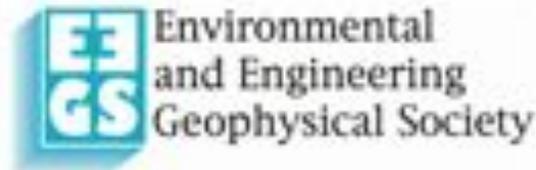
## Report on NSG workshop in Wuhan and ICEEG conference in Xi'An, China

The third Near Surface Geophysics Workshop at the China University of Geosciences (CUG) in Wuhan took place on June 18<sup>th</sup> and was organized by Yixian Xu and Jianghai Xia. Several NSGS Members attended this meeting and invited presentations were given by Alan Green, Klaus Holliger, Chih-Ping Liu, John Bradford, Lanbo Liu, Motoyuki Sato, Estella Atekwana, Jan van der Kruk, Recep Cakir, George Tsoflias, and Jianghai Xia. A few days later, the 6<sup>th</sup> biennial International Conference on Environmental and Engineering Geophysics (ICEEG) took place from June 20-22 where all the invited speakers from the workshop also gave presentations and acted as chairman/chairwoman. The chairs of the ICEEG conference were Wen Fan and Jianghai Xia. Both meetings were well-attended and during subsequent discussions, many ideas were exchanged to improve solving near-surface problems with Geophysics. In addition to the keynote sessions, the whole range of Near Surface Geophysics was covered by 15 sessions including “Urban Geophysics”, “Geophysical Instruments”, “Old mines Exploration Geophysics”, “Geophysics for Mine Disaster”, “Airborne Geophysics”, “Advances in Near Surface Geophysics”, and “Archaeological Geophysics”. On June 19, 2014, the Near-surface Geophysics Committee of Chinese Geophysical Society has been established. The Committee consists of 34 members and elected Jianghai Xia, a standing committee member of the Chinese Geophysical Society, as the President, Yixian Xu et al. as Vice Presidents, and Yixian Xu as the Secretary General. Several discussions took place to discuss possible cooperation to join forces between the NSG societies and work more closely together in the future. In two years, the fourth NSG Workshop and the 7<sup>th</sup> ICEEG conference will take place in Wuhan and Beijing, respectively.

Jan van der Kruk, John Bradford, and Jianghai Xia



*Invited Presenters and CUG students in front of the CUG Building. From left to right, on the first row: Yixian Xu, Jianghai Xia, Estella Atekwana, Alan G. Green, Chih-Ping Lin, Lanbo Liu, Jan van der Kruk, John Bradford, George Tsoflias, Motoyuki Sato, Recep Cakir, Klaus Holliger, Xiangyun Hu.*



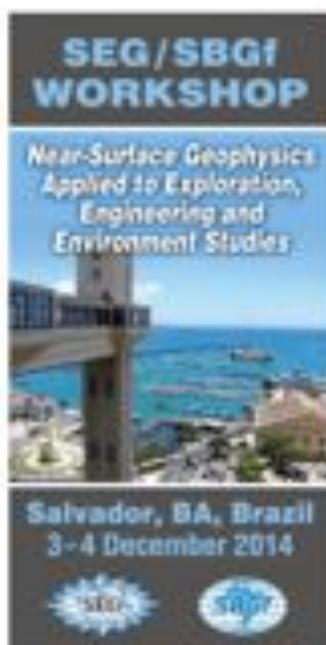
Conference organizers invite you to submit an abstract for SAGEEP to be held in Austin, Texas March 22-26, 2015. Technical Chair Brad Carr invites online submission of abstracts and, new for this SAGEEP, extended abstracts during the initial abstract submission period from September 5 to October 17, 2014. Authors of accepted abstracts will have an opportunity to revise and resubmit before the final submission date, January 19, 2015, or to upgrade an accepted abstract to an extended abstract. Those who choose to submit an extended abstract initially will also have the opportunity to revise and resubmit by January 19, 2015.

To access the online abstract submission site:  
<https://www.xcdsystem.com/sageep>

To access the EEGS website - SAGEEP 2015:  
<http://www.eegs.org/Annual-Meeting-SAGEEP/SAGEEP-2015/Abstracts-Sessions>

For questions concerning the abstract submission process, please contact:  
SAGEEP Technical Chair  
Bradley J. Carr, Ph.D.  
[bcarr1@uwyo.edu](mailto:bcarr1@uwyo.edu)

For questions about the SAGEEP conference, please contact:  
SAGEEP General Chair  
Jeffrey G. Paine, Ph.D.  
[jeff.paine@beg.utexas.edu](mailto:jeff.paine@beg.utexas.edu)



**Call for Papers**  
**Joint SEG/SBGf Near Surface Workshop**  
3-4 December 2014 • Salvador, Brazil  
Hotel Pestana Bahia



**1<sup>st</sup> SEG/SBGf Workshop on Near Surface Geophysics Applied to Exploration, Engineering and Environmental Studies**



**Paper & Application submission deadline: 31 August 2014**

The technical program for the 1<sup>st</sup> Near Surface Geophysics Workshop, co-organized by SEG and SBGf, offers a broad range of geophysical methods to address a diverse near surface community that utilizes geophysics methods applied to a large array of applications. The workshop is designed to attract professionals from varied geophysical sectors with a focus on engineering, environmental, hydrogeophysics, geohazard, as well as mining and shallow oil & gas exploration applications. Papers

on seismic processing workflow involving correction of statics/near surface heterogeneities and other modeling/inversion and processing techniques are also expected. Any case histories involving innovative use of geophysical techniques will be welcome.

Professionals from industry to academia, including those in consulting, service, government, mining, and O&G companies should find this workshop valuable for furthering knowledge and the exchange of ideas with an international group of professionals.

**The major topics and methods to be developed are:**

Session I - Seismic methods      Session II - Gravity and magnetic      Session III - Electric and electromagnetics  
Session IV - GPR Investigations      Session V - Borehole geophysics      Session VI - Modeling, inversion and processing techniques

**Sub-topics or geophysical applications:**

- Mineral and shallow O&G exploration geophysics
- Geophysical processing, modeling and inversion
- Geophysical for detection and monitoring of geohazards
- Environmental geophysics
- Groundwater geophysics
- Engineering geophysics and geotechnical applications
- Geophysical Investigation in urban and industrial sites
- Archeological geophysics and rescue applications

**MEETING SCHEDULE**

- Wednesday, 3 December 2014  
Full day sessions with Group Dinner in the evening
- Thursday, 4 December 2014  
Full-Day sessions

*The meeting will be comprised of oral presentations (including Keynote and invited speakers) followed by group discussions.*

**MEETING VENUE**

The Hotel Pestana Bahia, in Salvador, will serve as the meeting venue and will have sleeping rooms available at a group rate.

**ABSTRACT FORMAT**

Abstracts should include sufficient detail for the committee to judge the quality of the paper. Abstracts should be a minimum of half page text plus 1 figure, with a maximum of 2 pages. Abstracts should be on 8.5 x 11 inch paper size, have text in Roman font, and include both text and figures. The title should be one or two lines at the top of the page, in bold font, and size 12-14 points. Authors should be listed in Roman italic font, size 10-12 points,

and located just below the title. All text must stay 1 inch clear of the margins of the page. Submissions should be in Adobe Acrobat PDF format.

**SUBMISSION**

All abstracts should be submitted electronically, with the application form found on the second page of this call for contributions. Send all submissions to [pcryor@seg.org](mailto:pcryor@seg.org) (submissions via SEG) or to [eventos@sbgf.org.br](mailto:eventos@sbgf.org.br) (submissions via SBGf) in PDF format. Abstracts and Presentations are to be in English.

**ACCEPTANCE**

Direct participation of all workshop attendees is mandatory. Participation may be through oral presentation, or discussion contributions. An oral presentation is not a requirement in order to be accepted for registration. If the number of applicants exceeds the capacity of the conference facilities, preference will be given to presenters.



The 2015 Near Surface Asia Pacific Conference focuses on near-surface issues within the entire Pan-Pacific region and provides a world-class forum for new technical advances, developments, and applications in near-surface geophysics.

We welcome the submission of papers covering theoretical developments and case histories in the broad topic of near-surface geophysics, including:

- **Shallow Seismology**
- **Ground Penetrating Radar**
- **Electric, EM and NMR Methods**
- **Engineering Geophysics**
- **Mining and Geothermal Exploration**
- **Remote Sensing and Lidar Applications**
- **Hydrogeophysics**
- **Rock and Soil Properties**
- **Borehole Geophysics**
- **Modeling and Inversion**
- **Geophysical Instruments**

In addition, given that this year's venue is located on the Hawaiian volcanic chain, we will highlight geophysical applications to natural hazards focusing on volcanoes. Special sessions are planned for volcano characterization; monitoring, imaging, and stratigraphy of pyroclastic flows; geophysical applications to tsunamis; and passive/micro seismic methods for near surface applications.

As a new component to this year's conference, we invite proposals for additional special sessions and one-day post conference workshops. In your proposal, please identify the workshop or session organizers, potential invited speakers, and a brief description of the topic and its relevance to the conference.

## Call for Papers

**Abstract submission deadline:  
21 November 2014**

**Early Bird registration deadline:  
7 June 2015**

**Lead Partner:  
Society of Exploration Geophysicists**

**Cosponsored by:  
Australian Society of  
Exploration Geophysicists  
Korean Society of Earth and  
Exploration Geophysicists  
Society of Exploration  
Geophysicists of Japan  
Chinese Geophysical Society**

**Organizing Committee:  
John Bradford  
Boise State University  
Jian Guo  
Chinese Geophysical Society  
Koya Suto  
Tama Australia Geophysics Pty Ltd.  
Myeong-Jong Yi  
Korean Institute of Geoscience  
and Mineral Resources  
Dr. Jun Matusima  
Tokyo Institute of Technology**

### Meeting Schedule

Tuesday, 7 July: Registration

Wednesday, 8 July – Friday, 10 July: Joint Opening Keynote and full day break-out sessions.

There will be a gala dinner on one of the evenings.

### Abstract Format

Abstracts should include sufficient detail for the committee to judge the quality of the proposed presentation. Abstracts should be a 4 page extended abstract, in Times Roman font size 10-12 points. The title should be in bold font. Below the title, authors should be listed. Immediately below the list of authors, please give the affiliations and email addresses for all authors. All text must stay 1 inch clear of the margins of the page.

### Exhibition & Sponsorship

The Exhibit Hall will be open Wednesday, 8 July - Friday, 10 July. For more information on exhibiting at this event or for sponsorship opportunities, contact Dick Rauner at [drauner@seg.org](mailto:drauner@seg.org).

### Meeting Venue

The event will take place at the Hilton Waikoloa Village in Waikoloa, Hawaii. More information regarding this venue can be found at <http://www.hiltonwaikoloavillage.com/>

### Abstract Submission

All abstracts along with application forms must be submitted electronically to [nsipac@seg.org](mailto:nsipac@seg.org) in PDF format, by 21 November.

# The Leading Edge: Upcoming Special Issue

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## Call for Near-Surface Geophysics manuscripts

The February 2015 issue of the Leading Edge will focus on Near-Surface Geophysics. Please consider a submission to this special edition. The widespread distribution of TLE will enable a broad impact of your contribution. Your research, experience, and expertise is on the cutting edge of near-surface geophysics and is greatly welcomed and encouraged to make the Feb 2015 a success. The submission details are attached and a timeline of the submission is detailed below.

**Oct 15:** articles due to guest editor (GE)

**Oct 15 - Nov 15:** GE reviews submissions

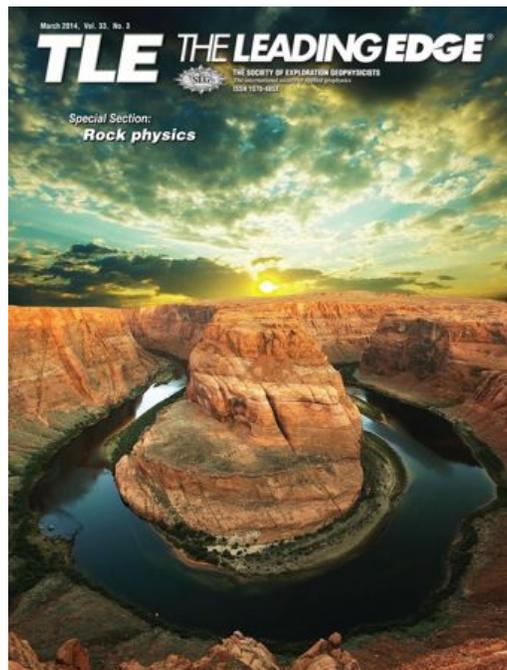
**Nov 15:** GE lets authors know approved, rejected, suggestions for revision

**Nov 15 - Dec 1:** authors revise articles, return revision to GE

**Dec 1 - Dec 15:** GE reviews revision, makes any final changes

**Dec 15:** revised articles due to TLE editorial staff, upload to SEG ftp site

If you are interested in submitting an article on Humanitarian Geophysics to TLE, please contact Dale Werkema ([Werkema.D@epa.gov](mailto:Werkema.D@epa.gov)), Guest Editor February 2015 TLE



# CALL FOR PAPERS

► **Submission deadline:**  
**30 August 2014**

<https://mc.manuscriptcentral.com/interpretation>

A joint publication of SEG and AAPG  
**Interpretation**<sup>™</sup>  
A journal of subsurface characterization



Society of Exploration  
Geophysicists  
The international society  
of applied geophysics



## ***Geophysical imaging and interpretation of outcrops***

Outcrops have long been studied as analogs for rocks rich in natural resources, including hydrocarbons, minerals, and groundwater. Outcrops provide highly detailed information on facies assemblages, stratigraphy, textural and petrographic variability, and fracture patterns, among others. However, except in a few exceptional cases, this information is strictly two-dimensional. Geophysical tools allow for a "look behind the cliff," thus enabling 2D outcrop analog data to be extended into the third dimension. Such geophysical investigations can be operated from the cliff top, cliff face, and boreholes.

With the increasing demand for unconventional, geothermal, mineral and water resources as exploration targets there is a renewed interest in detailed outcrop studies. For this special section of *Interpretation*, we invite papers that focus on applying geophysical tools (e.g., seismic, ground-penetrating radar, and downhole geophysical logging) for imaging and interpretation of outcrops. We also invite papers that use Lidar and high-resolution outcrop imagery in combination with behind-the-cliff geophysical data or synthetics.

The focus of the work can be on geophysical imaging and modeling, 3D facies analysis and sequence stratigraphy, studies of deformation and faulting, mineralization, fracture zones, and generating high-resolution input for geological modeling of both sedimentary and crystalline systems. Case studies for specific outcrop analogs are also welcomed.



Image courtesy of M. Pipan

*Interpretation*, copublished by SEG and AAPG, aims to advance the practice of subsurface interpretation.

The submissions will be processed according to the following timeline:

**Submission deadline:**  
**30 August 2014**

**Publication of issue:**  
**May 2015**

### Special section editors:

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**Joep E.A. Storms**  
J.E.A.Storms@tudelft.nl

## Calendar of Upcoming Events

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<b>Dates</b>	<b>Title</b>	<b>Location</b>
October 7, 2014	Deadline for SAGEEP Abstract submission	n/a
October 15, 2014	Deadline for submission - TLE Near-Surface Geophysics	n/a
Oct 26 - 31, 2014	SEG Annual Meeting	Denver, CO, USA
Dec 3 - 4, 2014	SBGf-SEG Joint Workshop on Near-Surface Geophysics <a href="http://www.seg.org/meetings/Salvador2014">http://www.seg.org/meetings/Salvador2014</a>	Salvador, BA, Brazil
Dec 15 - 19, 2014	AGU Annual Meeting	San Francisco, CA, USA
Feb 15 - 18, 2015	ASEG-PESA 24 <sup>th</sup> International Geophysical Conference and Exhibition <a href="http://www.conference.aseg.org.au">www.conference.aseg.org.au</a>	Perth, WA, Australia
March 22-26, 2015	28th Symposium on the Application of Geophysics to Engineering & Environmental Problems (SAGEEP)	Austin, TX, USA
July 7 - 10, 2015	SEG Asia-Pacific Near Surface Meeting	Waikoloa Hilton, HI, USA

## NSGS Membership

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Please encourage your colleagues to join the NSGS. Membership for students is free! All NSGS members must, however, also be members of our mother society SEG.

NSGS membership exists in three classes based on the corresponding membership status with SEG:

- Active: active member of SEG (15\$ / year)
- Affiliate: associate member of SEG (15\$ / year)
- Student: student member of SEG (free!!!)

Membership applications can be found at: <http://nsgs.seg.org/member-become.php>

# Job Postings

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## PhD Student, 3D GPR Full-waveform Inversion Forschungszentrum Jülich, Jülich, Germany

The Forschungszentrum Jülich is one of the largest interdisciplinary research centers in Europe and is a member of the Helmholtz Association of German National Research Centers. Our key research areas are “Health”, “Energy and the Environment”, and “Information.”

For our Institute of Bio- and Geosciences - Agrosphere (IBG-3) we are seeking a **PhD Student with a degree in geophysics, physics, electrical engineering, computational geoscience, or related natural sciences** for a three-year PhD position.

### Project description “3D GPR Full-waveform Inversion”:

In the IBG-3, advanced modeling and inversion algorithms are developed and applied for a wide range of hydrogeophysical studies using ElectroMagnetic Induction (EMI) or Ground Penetrating Radar (GPR) systems. The primary objective of this project is to develop and extend existing 2D full-waveform inversion algorithms for 3D GPR data with the ultimate goal of obtaining quantitative information on hydrogeophysical properties. Specific components of the project will include: (i) improving the forward model used in the inversion, (ii) writing a new algorithm to accommodate the full-waveform inversion of 3D surface GPR data, (iii) recording, processing and inverting two GPR data sets, one acquired under controlled conditions and one acquired from a hydrogeological TERENO test site. The project offers the unique opportunity to connect novel full-waveform techniques to real data in a state-of-the-art computational environment.

### Requirements:

- University degree in geophysics, physics, electrical engineering, computational geoscience, or related natural sciences with a good final grade; preferably with knowledge in wave propagation techniques
- Advanced knowledge of numerical methods
- Experience in (parallel) programming preferably in C/C++ and/or Fortran
- Strong English writing and communication skills.

### We Offer:

- working in an interdisciplinary environment as well as excellent facilities for hydrogeophysical research and numerical simulation and inversion studies
- Opportunities to being part of the national and international scientific community For further information please contact Prof. Dr. Jan van der Kruk, e-mail: [j.van.der.kruk@fz-juelich.de](mailto:j.van.der.kruk@fz-juelich.de)

Please send your application - quoting the reference number D045/2014 - with the relevant documentation to: Mr. K. Beumers, Institut für Bio- und Geowissenschaften, Forschungszentrum Jülich GmbH, 52425 Jülich, Germany, e-mail: [k.beumers@fz-juelich.de](mailto:k.beumers@fz-juelich.de).

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## Electromagnetic Research Scientist Halliburton’s Electromagnetic Discipline based in Houston, Texas.

This position involves research and development for cutting edge technology applications in the energy industry, with the opportunity to be involved with innovative solutions to a wide range of electromagnetic sensing problems.

### Requirements:

Good knowledge of electromagnetic theory and computational electromagnetics is a must.

Working knowledge of electrode and induction based sensors is a plus.

Candidate should be familiar with one or more of the following simulation methods: Finite Difference (FD), Finite-Element (FE), Method of Moments (MoM), Integral Equations (IE), semi-analytic solutions in stratified media.

Experience with electromagnetic modeling in HFSS software is a plus.

Applicants should be familiar with EM inversion, and have experience with one or more of the following numerical optimization methods: Conjugate gradients, Gauss-Newton.

Experience with Fortran programming language, MATLAB scripts, and good communication skill is also required.

Applicants should apply directly to Denise Day via email, [denise.day@halliburton.com](mailto:denise.day@halliburton.com).

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**Assistant Professor, Geophysics  
Colgate University**

The Department of Geology at Colgate University invites applications for a tenure-stream position in Geophysics at the rank of Assistant Professor, beginning fall semester 2015. We seek an individual with a Ph.D. who is committed to excellence in teaching and research at the undergraduate level. Completion of the Ph.D. is expected prior to or shortly after the date of hire. The area of specialization is open. The successful applicant will teach Geophysics and develop other courses at the introductory level for non-majors and at the upper-level for geology students. Participation in the Geology Department's summer field courses, involvement of undergraduates in research, and a willingness to contribute to other all-university curricula, such as the Scientific Perspectives program in the university's Core Curriculum, are expected.

A cover letter, CV, research and teaching statements, and reference letters must be submitted through <https://academicjobsonline.org/ajo/jobs/4548>.

Colgate strives to be a community supportive of diverse perspectives, identities and ways of life. Candidates are encouraged to describe [in their cover letter] their strengths and experiences in teaching diverse student populations and in promoting a diverse and inclusive educational environment. Colgate is an EEO/AA employer; women and candidates from historically underrepresented groups are especially encouraged to apply. Review of applications will begin October 13, 2014, and will continue until the position is filled. Applicants with dual-career considerations can find postings of other employment opportunities at Colgate and at other institutions of higher education in upstate New York at [www.upstatenyherc.org](http://www.upstatenyherc.org) <<http://www.upstatenyherc.org>>.

Developing and sustaining a diverse faculty, staff, and student body further the University's educational mission.

Colgate is a highly selective liberal arts university of 2800 students situated in central New York. Colgate faculty are committed to excellence in both teaching and scholarship. The Geology Department comprises eight faculty, a senior lecturer/lab instructor, and a technician. Analytical facilities include SEM-EDS, XRF, XRD, ICP-MS, GC-MS, AA, stable isotope mass spectrometer, and micropaleontology lab. Information about the Geology department can be found at <http://www.colgate.edu/academics/departments-and-programs/geology>.

For further information about the position please contact the department chair or department members at the GSA meeting in Vancouver.

Further Info:

William Peck <[wpeck@colgate.edu](mailto:wpeck@colgate.edu)>  
315-228-7201

220 Ho Science Center  
Colgate University  
13 Oak Drive  
Hamilton, NY 13346