



**NEAR-SURFACE GEOPHYSICS FOCUS GROUP  
NEWSLETTER: JULY 2013**

**In brief:**

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Recent announcements of interest to the NS community (conferences, academic positions, graduate student opportunities etc.) can be found at the AGU NS-Focus Group Web Page: <http://sites.agu.org/nsg/>

**Follow NSFG on Twitter @NS\_AGU!**

## **1. Call for Nominations for 2014 SEG Near Surface Honorary Lecturer (from John Bradford)**

**Nomination Deadline:** 13 July, 2013

In 2012, SEG expanded the Honorary Lecture (HL) Program to include the first thematic lecturer in Near Surface (NS). After the inaugural NS lecture tour by Rick Miller in 2012, Valentina Socco will present the upcoming 2013 lecture titled: "*Surface wave analysis for near-surface characterization: Introduction, theme and variations.*"

**Now is the time to submit nominations for the 2014 Honorary Lecturer!** Please submit completed nomination forms to Judy Wall ([jwall@seg.org](mailto:jwall@seg.org)). The nomination period ends on 13 July, 2013. The NSG community needs to support the NS HL and the first step is through nominations.

The goals of the Honorary Lecture program are to recognize an individual's contributions to advancing the science and technology of geophysics, foster a sense of community amongst geophysicists by providing opportunities for local meetings and exchange of ideas, and encourage students by providing the opportunity to discuss scientific and career issues with a leading expert.

The lecturer should be an expert in their field, an effective representative of SEG and an outstanding communicator. The lecture topic should be current and of global interest. The HL committee seeks nominations for many outstanding individuals; if you know a candidate to represent the SEG NSG in 10 - 12 domestic and international cities in 2014, please submit a nomination form today.

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## **2. "Advances in Unsaturated Geophysics" Session at GSA (from Kamini Singha)**

**Abstract Deadline:** 6 Aug., 2013

**Website:** <http://community.geosociety.org/2013AnnualMeeting/Home>

This year there's a session entitled "Advances in Unsaturated Geophysics" at the annual Geological Society of America meeting. This session focuses on geophysical methods for quantitative estimation and imaging of unsaturated zone hydrologic properties and processes. Laboratory- to field-scale examples of new methods to acquire, analyze, and interpret vadose zone geophysics are encouraged. The meeting is Oct 27-30 in Denver, and abstracts are due 6 August. Contact session chairs John Lane (USGS) and Kamini Singha (Colorado School of Mines) with any questions.

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## **3. Last Month's Twitter Highlights (from Stephen Moysey)**

Want to keep up on deadlines and happenings that get missed between newsletters? Sign up on [Twitter](#) to follow us [@NS\\_AGU](#). Here are a few Tweets from last month:

- EEGS Foundation auction of a Geonics EM-38 on eBay (starts 8 July);
  - Link to AGU Science Policy webcasts;
  - EarthCube Summer Institute Applications (professor, researchers and students) due 2 July;
  - NSF Earth Sciences Postdoctoral Fellowship applications due 18 July;
  - Dozens of funding opps, events, calls for papers, and more in the new EarthCube newsletter;
  - Advice for live tweeting scientific talks from AGU
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#### 4. List of Proposed Sessions for AGU 2013 Fall Meeting: Abstracts DUE AUG 6 (from X. Comas)

Submit your abstract for the fall meeting now! [Click here for abstract submission site.](#)

**Important dates for the 2013 Fall Meeting:**

July 15: Registration and Housing opens  
August 6: Abstract submission deadline  
Dec. 9-13: 2013 Fall Meeting

Please see below for a list of proposed Near Surface and Hydrogeophysics sessions that are likely to be of interest to members of the NSFG.

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### PROPOSED NEAR SURFACE GEOPHYSICS (NS) SESSIONS

**TITLE: *Advances in Archaeological Geophysics***

**CONVENERS:** M.E. Everett, Geology and Geophysics, Texas A & M Univ, College Station, TX | L. Conyers, Anthropology, University of Denver, Denver, CO | T.S. de Smet, Anthropology, Texas A & M Univ, College Station, TX

**DESCRIPTION:** Advances in instrumentation and software have led to greater use of geophysical techniques at historic and prehistoric archaeological sites, and for heritage and cultural resource preservation. New developments in data acquisition, processing, modeling, interpretation, and information fusion have yielded both an increase in areal coverage and improved target discrimination and classification. Archaeological geophysics, long used to guide excavation strategy and constrain site formation theories, is now moving beyond prospection and contributing to fundamental anthropological questions about human behavior, social organization, and cultural changes through time.

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**TITLE: *Ground Penetrating Radar (GPR) method: Advanced Research and Case studies***

**CONVENERS:** S. Quadfeul, Geophysics, Algerian Petroleum Institute, IAP, Algeria, Boumerdes, ALGERIA | Leila Aliouane, Faculty of Hydrocarbone and Chemistry, University M'hamed Bougara Boumerdes, Algeria

**DESCRIPTION:** Ground Penetrating Radar (GPR) has becoming very useful method in geophysics. It is used for near surface studies, geophysical exploration, mining, structural studies, natural hazards, landslides...etc. The aim of this session is to present latest researches on GPR method. Papers are invited on, but not limited to, the following topics: - GPR Wave Interaction with Earth - Novel GPR Systems and Antennas - Numerical Modeling - Inverse Problems - Data Processing, Interpretation - SAR and Planetary Exploration - Evaluation of Mining - Archaeology, Diagnosis of historical buildings - Hydrology and Glaciology - Geology/Geotechnical, Detection and Mapping - Demining and UXO - Borehole - Exploration geophysics.

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**TITLE: *Near Surface Geophysics General Contributions***

**CONVENERS:** X. Comas, Florida Atlantic University, Boca Raton, FL | B.D. Smith, USGS, Denver, CO |

**DESCRIPTION:** This session targets contributions that fall within the broad spectrum of Near Surface Geophysics, but are not directly appropriate to any of the other sessions proposed for the focus group. This session is a collaboration between the Near Surface Focus Group and the Environmental and Engineering Geophysical Society (EEGS)

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**TITLE:** *Geophysical monitoring and modeling of microbial mediated processes at laboratory and field scales*

**CONVENERS:** C. Zhang, Colorado School of Mines, Golden, CO | D. Ntarlagiannis, Rutgers University, Newark, NJ | G.Z. Abdel Aal, Oklahoma State University, Stillwater, OK

**DESCRIPTION:** The unique advantages of geophysical methods (non-invasive, real time, high spatiotemporal resolution) have led to an increased volume of research to monitor and characterize both direct (e.g., microbe growth and biofilm formation) and indirect (e.g., mineral and hydrological biotransformations) subsurface microbial activities over different scales. We invite work on the current and novel geophysical methods for observing microbial mediated processes at laboratory and field scales, the development of geophysical modeling framework to advance the understanding of complex biogeochemical systems, and the utilization of geophysical techniques as proxy for different biogeochemical processes.

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**TITLE:** *Geophysical Methods for Groundwater Evaluation and Management*

**CONVENERS:** J.W. Lane, Office of Groundwater, Branch of Geophysics, USGS, Storrs, CT | R.J. Knight, Dept. of Geophysics, Stanford University, Stanford, CA

**DESCRIPTION:** Effective, sustainable management of groundwater resources requires accurate knowledge of groundwater recharge, storage, and withdrawal. In this session we focus on the application of geophysical methods using subsurface, surface, airborne, or satellite sensors to quantify subsurface properties and processes. Of interest are examples related to all aspects of groundwater management including, but not limited to, development of hydrostratigraphic models, assessment of aquifer properties, evaluation of groundwater quantity and quality, monitoring of natural/managed processes. All approaches are of interest including laboratory and field experiments, theoretical and numerical modeling.

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**TITLE:** *Advances in Airborne Electromagnetics*

**CONVENERS:** P. Bedrosian, United States Geological Survey, Denver, CO | E. Auken, University of Aarhus, Aarhus, DENMARK

**DESCRIPTION:** Applications of airborne electromagnetic (AEM) methods have exploded in recent years from their traditional use in mineral exploration to include hydrologic studies, natural hazard assessment, ice and permafrost mapping, and geologic mapping. Advances in instrumentation, processing techniques, and inversion methodologies are pushing the capabilities of AEM methods in resolving near-surface structure. We welcome contributions that highlight advances in AEM instrumentation, processing, modeling, and inversion. We particularly invite case studies that represent novel uses of AEM methods or highlight an integrated approach where geological, hydrological, or geochemical data are coupled with AEM models to address process-oriented questions.

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**TITLE:** *Developments and Practical Applications of the Multichannel Seismic-Data Surface-Wave Analysis Method*

**CONVENERS:** G.P. Tsoflias, Department of Geology, University of Kansas, Lawrence, KS | R.D. Miller, J. Ivanov, Kansas Geological Survey, University of Kansas, Lawrence, KS

**DESCRIPTION:** This session will focus on recent developments and practical applications of the multichannel analysis of surface waves using both active and passive seismic sources for the purposes of 1-D, 2-D, and 3-D shear-wave velocity ( $V_s$ ) profile estimations. Possible topics can include numerical developments in optimal field-parameter estimations, dispersion-curve imaging and modeling techniques, multi-mode interpretation and inversion, sensitivity analysis. Case studies with practical applications of the surface wave method alone or in joint inversion/analysis with other geophysical methods are welcome. This session is a collaboration with the Near Surface Section of the SEG (NSG).

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**TITLE: *Monitoring of LNAPL in the subsurface: current trends in environmental applications***

**CONVENERS:** D. Ntarlagiannis, Rutgers University, Newark, NJ | R. Costa, Weston Solutions, Edison, NJ

**DESCRIPTION:** Subsurface LNAPL contamination is a big environmental problem. Small/contained plumes are treated successfully while for large plumes/complex environments natural attenuation is the option of choice. Bioremediation is expected to rise due to changes favoring energy efficient methods over energy costly remediation methods. Improvements in the collection and interpretation of geophysical data have provided promising results in laboratory or pilot field projects but field validation is critical for the acceptance of such methods. We invite cutting edge research on hydrocarbon characterizing/monitoring efforts and case studies from established methods to bridge the gap between research and field applications.

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**TITLE: *Advances in Near Surface Fracture Studies***

**CONVENERS:** J.M. Lorenzo, Geology and Geophysics, Louisiana State Univ, Baton Rouge, LA | A. Dahi-Taleghani, Petroleum Engineering, Louisiana State Univ, Baton Rouge, LA | J. Le Calvez, Schlumberger, Dallas, TX

**DESCRIPTION:** Hydraulic fracturing is the technique of choice to stimulate fluid flow in unconventional hydrocarbon-bearing and geothermal reservoirs. Microseismic monitoring and real-time or post-acquisition data analysis can be used to evaluate the 4D evolution of hydraulically-induced fracture networks. However, current analytical tools and the physical models that explain fracture growth are still in their infancy. We welcome presentations of laboratory, field or theoretical results that shed light on the physics of hydraulic fracture initiation, development and interaction. We also encourage discussion on the reliability of seismic inversion procedures which are critical for testing these models in field data.

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**TITLE: *Advances in Exploration Geophysics***

**CONVENERS:** L. Pellerin, Green Geophysics, Berkeley, CA | D. McPhee, US Geological Survey, Menlo Park, CA

**DESCRIPTION:** We seek papers on the advancement of geophysical methodology, instrumentation, processing, modeling and/or interpretation as applied to customary oil & gas, unconventional resource, geothermal, mineral, hydrological, environmental and other areas of exploration. Seismic, electromagnetic, gravity, magnetics, ground penetrating radar, in addition to more non-traditional geophysical methods and integrated techniques are of interest. Case histories are welcome.

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## **PROPOSED HYDROGEOPHYSICS (H) SESSIONS**

**TITLE: *Innovative Methods in Hydrogeology***

**CONVENERS:** P.K. Mishra, Civil & Environmental Engineering, California State University, Fullerton, CA | D.Mao, Hydrology and Water Resources, University of Arizona, Tucson, AZ | X. Liu, Hydrogeology Department, Earth Science Division, Lawrence Berkeley National Laboratory, Berkeley, CA | P.K. Mishra, Computational Earth Sciences, Los Alamos National Laboratory, Los Alamos, NM

**DESCRIPTION:** Despite advances in modeling tools, inverse techniques and geophysical methods, complete understanding of hydrogeological processes remains elusive, and fundamental subsurface flow and transport problems remains extremely difficult due to spatial heterogeneity of geological structures, temporal variability of complex linear and nonlinear fluid dynamics, and coupling between chemical, physical, and biological processes. We seek contributions on approaches that can improve our understanding of the complex hydrogeological system. Contributions may include or span innovations in hydrogeological modeling, inverse methodologies, computational techniques, hydrogeophysics, and lab and field testing methods.

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**TITLE: *Hydrogeophysical Data Integration and Joint Inversion***

**CONVENERS:** M.A. Cardiff, Dept of Geoscience, University of Wisconsin-Madison, Madison, WI | B. Dafflon, Earth Sciences Division, Lawrence Berkeley National Laboratory, Berkeley, CA

**DESCRIPTION:** Hydrogeophysical investigations require the use of specialized methods for “fusing” the information available from both hydrologic and geophysical data sources. This session seeks contributions of novel methodologies to perform data integration or joint inversion (broadly, “data fusion”) in the context of hydrogeophysics. Topics of interest include, but are not limited to: use of coupled modeling frameworks, clever methods for data or model reduction (e.g., signal processing or filtering approaches), methods for assigning weights to multiple data sources, novel strategies for spatial or temporal regularization, strategies for assessing characterization uncertainty, and methods for improving computational efficiency of data fusion.

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**TITLE: *Hydrogeophysics: Laboratory to Field Scale Characterization***

**CONVENERS:** M. DOGAN, Department of Geological Sciences, Michigan State University, East Lansing, MI | R.D. Swanson, Hydrologic Science and Engineering, Colorado School of Mines, Golden, CO

**DESCRIPTION:** Groundwater-related problems are often too complex to solve using only in-situ measurement methods due to limited data resolution or extent. Minimally-invasive geophysical methods may improve data content and spatial coverage. This session demonstrates the role of geophysical data in hydrological investigations, covering a broad range of applications and scales. We encourage laboratory- and field-based contributions aiming at, for example, characterization of hydraulic properties, and monitoring of contaminant migration, biological and biogeochemical processes. Theoretical and methodological contributions focusing on the data collection, modeling, and petrophysical relationships of relevance in hydrogeophysics are also welcome.

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**TITLE: *Geophysics for the critical zone***

**CONVENERS:** U. Werban, P. Dietrich, S. Zacharias, Monitoring & Exploration Technologies, Helmholtz Centre for Environmental Research - UFZ, Leipzig, GERMANY | P. Dietrich, Eberhard-Karls-University, Tübingen, GERMANY

**DESCRIPTION:** We will address the state of the art of geophysical techniques applied for mapping and monitoring of the pedosphere and unsaturated vadose zone. There is particular interest in the use of proximal sensing technologies for prediction of soil properties and observation of dynamic processes within the unsaturated zone. Geophysical techniques are widely used in Digital Soil Mapping. Furthermore, in the context of environmental modelling, there is a growing demand to provide multi-scale information. However, results are often limited to qualitative information and results are ambiguous. Reliable quantification is a major challenge. A promising approach is multi sensor mapping combining, e.g EMI, ERT, GPR, passive gamma radiometry, TDR, cosmic ray probes etc.

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**TITLE: *The hydrogeology and near-surface geophysics nexus***

**CONVENERS:** B. Malama, K.L. Kuhlman, Sandia National Laboratories, Carlsbad, NM

**DESCRIPTION:** Submissions are encouraged for modeling and field methods coupling hydrogeology processes to near-surface geophysics, for hydraulic characterization of the subsurface. Traditional methods of measuring the hydraulic system state with pumping and observation wells are costly, intrusive, and yield only spatially sparse data. Geophysical methods directly coupled to subsurface hydrogeological processes including groundwater flow and contaminant transport promise to ameliorate shortcomings of traditional methods of hydrogeological characterization. We solicit discussions of philosophical underpinnings of methods, new advances bridging the hydrogeology-geophysics science gap, and limitations of the past and present methodologies.

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**TITLE: *Underground Testing, Monitoring and Modeling in Different Formations***

**CONVENERS:** J.S. Wang, Lawrence Berkeley Laboratory, Berkeley, CA | R.W. Zimmerman, Imperial College, London, UNITED KINGDOM

**DESCRIPTION:** Underground Research Laboratories, facilities, and borehole complexes provide valuable access to conduct tests and detect changes at depth for better understanding of Earth processes. Along existing or new tunnels, and within mined levels, instruments can be installed to measure hydrological, rock mechanical, geotechnical, seismic, electromagnetic, and biogeochemical signals. This session invites contributions from geoscience communities to present measured results and research findings, including modeling results and plans as well, from all underground sites. The interactions and exchanges contribute to potential networking, and develop synergies for advancing collaborations.

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**TITLE: *Persistent problems and modern approaches in multiphase flow in porous media: From pore to laboratory and field-scale***

**CONVENERS:** F. Doster, Civil and Environmental Engineering, Princeton University, Princeton, NJ | L. Cueto-Felgueroso, Civil and Environmental Engineering, Massachusetts Institute of Technology, Cambridge, MA | F. Doster, Mathematics, University of Bergen, Bergen, NORWAY | D. Lasseux, INSTITUT DE MECANIQUE ET D'INGENIERIE, University of Bordeaux, Bordeaux, FRANCE

**DESCRIPTION:** Understanding flow and transport processes in porous media remains a challenge. Standard theories on continuum-scales have limitations in terms of self-consistency on different length and time scales, describing and predicting trapping, inter-phase transfer processes and other phenomena. Resolving these limitations is particularly relevant for large-scale applications in time and space like carbon sequestration and radioactive waste disposal. We solicit experimental, computational, or theoretical submissions on the quantification of pore-scale processes and their relation to larger scale phenomena, alternatives and limitations for continuum-scale models.

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**TITLE: *Hydrogeophysical characterization of the critical zone***

**CONVENERS:** D.W. Hyndman, Michigan State University, East Lansing, MI

**DESCRIPTION:** This session seeks presentations that characterize properties and processes in the critical zone. We encourage contributions that include new geophysical and hydrologic methods to characterize this region from the vegetation down to unweathered bedrock, which provides critical services for humans and ecosystems. Presentations that examine interactions of plants, water, solutes, and soils using geophysical and hydrologic techniques, as well as those that develop inversion methods and novel models for this zone are also encouraged.

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## 5. Position Announcements

### 5.1 Post-Doc and PhD Positions at the University of Western Australia (from Mark Jessel)

As part of a new initiative at the Centre for Exploration Targeting at the University of Western Australia we are currently seeking candidates for two 4-year postdoctoral fellowships and 2 PhD candidates starting 4th quarter 2013 to work on topics related to joint geological and geophysical modelling and inversion. The full position descriptions and application process will be soon be posted online, however initial contact can already be made with: [mark.jessel@gmail.com](mailto:mark.jessel@gmail.com).

#### ***Postdoctoral Fellow 1: Multiply Constrained 3D Geologically Modelling***

We seek a highly motivated geoscientist (geophysicist) to develop algorithms and workflows that allow the full range of geological field observations, including age relationships, to be captured and used as constraints in the 3D modelling process. The successful applicant must have a doctoral qualification or equivalent scholarly attainment in geoscience and the strong desire to deliver applied research to the minerals industry.

#### ***Postdoctoral Fellow 2: Joint Geophysical Inversion***

The Post-Doctoral Fellow will develop and apply the TOMOFAST3D code being developed as collaboration between the CET and the University of Toulouse/CNRS. TOMOFAST3D is a parallel code that has been developed by Dr. Roland Martin and co-workers at the CNRS Laboratory "Géosciences Environnement Toulouse" in France. The code is able to perform joint inversions on huge geophysical data sets, using gravimetry and magnetism for instance. The successful applicant must have a doctoral qualification or equivalent scholarly attainment in geoscience and the strong desire to deliver applied research to the minerals industry.

#### ***PhD Scholarship 1: Characterizing Geological and Geophysical Uncertainty***

This project will focus on the application of new and existing algorithms capable of characterising the ambiguity in 3D model suites in terms of both geometry and petrophysical properties. This ambiguity analysis will also feed into the sensitivity analysis that can identify which existing data is most critical in determining the outcomes of the modelling, and what (and where) new data could be collected to further reduce ambiguity. Experience in geological modelling is welcomed, and coding skills are essential.

#### ***PhD Scholarship 2: Integrated Geological and Geophysical Inversion***

This project will focus on the development and application of workflows which combine multiple geological hypotheses of the 3D geology of the earth as inputs for joint geophysical inversion in order to build an iterative coupled geological/geophysical solver.



## 5.2 Research Scientist Position in Mineral Exploration (from Richard Smith)

A consortium of Canadian Universities in partnership with the Canadian Mining Innovation Council is assembling a team of research scientists to play a leadership role in coordinating multidisciplinary research to characterize the “footprints” of ore-systems and establish exploration vectors of Canada’s most important mineral deposits. The ultimate goal is to develop state-of-the-art integrated exploration strategies that are applicable over a range of deposit types. The first phase of the research project will involve building a “footprint” matrix of geological, lithochemical, mineralogical, surficial, petrophysical, and geophysical data of the world-class Canadian Malartic gold mine near Val d’Or, Québec; the McArthur River-Millennium uranium trend in northern Saskatchewan; and the Highland Valley porphyry copper-molybdenum system near Kamloops, British Columbia. The members of the research team will be affiliated with and paid by universities, but work closely with the host and sponsoring companies. The candidate we are seeking in this advertisement will be responsible for processing and inverting geophysical data acquired at all three sites and will work closely with researchers from the three sites. In addition the candidate will be encouraged to develop interactions between professional geoscientists and students from 20 universities, 20 mineral exploration and service companies, Geological Survey of Canada (TGI-4, GSC-Victoria), Géologie Québec, Geological Survey of Saskatchewan, and Geoscience BC that are also working on the project. This is a unique opportunity to become involved in the largest collaboration between the mineral exploration industry and academic-government researchers ever developed in Canada.

The applicant must hold a PhD degree, have excellent oral and written communication skills, and be able to work effectively in and between academic and industry environments. The level of appointment (Post-Doctoral Fellow or Research Associate) and salary (\$60-100k including benefits) will be commensurate with experience. Relocation costs up to \$5000 will be paid or reimbursed. The position will be for one year, but can be extended until March 2018 if mutually agreed.

The applicant must have an ability to process geophysical data (Geosoft Oasis) and model geophysical data with geological constraints (UBC, or other) and to derive and validate inversion models using various software packages. Experience developing data processing or inversion tools would be preferred. We require exposure to potential field methods, but candidates that also have experience with electromagnetic and electrical methods would be preferred. The successful applicant will work with researchers who are compiling the geological, geophysical and physical property data at each site; work with PhD and MSc students; and will participate in site meetings, annual field workshops, and annual general meetings. Experience with mineral deposits, and geological concepts applied to geophysical interpretation is desirable and candidates will ideally have some knowledge of exploration methods. Applications will be assessed based on merit and will be accepted from all qualified candidates, but in accordance with Canadian immigration requirements, preference in the first instance will be given to Canadian citizens and permanent residents. Screening of applications will begin immediately, but applications will be accepted until the positions are filled.

Applications, including cover letter, CV, and the names and e-mail addresses of 3 references, should be sent to Prof. Richard Smith [rsmith@laurentian.ca](mailto:rsmith@laurentian.ca). Questions about the research plans and skill sets required should be directed to the same person. Information about CMIC can be found at [www.cmic-ccim.org](http://www.cmic-ccim.org) and the footprint project at <http://www.cmic-ccim.org/en/innovation/Footprints.asp>.

Laurentian University is an equal-opportunity employer committed to equity in employment and encourages applications from women, aboriginal peoples, members of visible minorities, and persons with disabilities. Members of Designated Groups are encouraged to self-identify on their applications.

**TO CONTRIBUTE MATERIAL TO THE NS-NEWSLETTER SEND AN E-MAIL TO:**

Stephen Moysey ([smoysey@clermson.edu](mailto:smoysey@clermson.edu))

DEADLINE: Material must be received 4 full business days prior to the first of each month.

GUIDELINES FOR SUBMISSIONS: All members are welcome to submit content of interest to the NS community. Please keep messages brief and provide contact information and (if available) a web address for additional information.

**GET YOUR MESSAGE OUT NS MEMBERS FASTER:**

You will no longer need to wait until the end of the month to share an important or time-sensitive contribution to the newsletter. Appropriate contributions to the newsletter will also be shared ASAP via Twitter. Please note that only NSFG members that follow [@NS\\_AGU](#) will receive Twitter announcements, so make sure that you sign up!