American Geophysical Union

Near-Surface Geophysics Focus Group (NSFG)
Newsletter: February 2016

In Brief:

Recent announcements of interest to the near-surface community (conferences, academic positions, graduate student opportunities, etc.) can be found on the AGU Near-Surface Geophysics Focus Group website.

Early Career Scientists: Check out the NSFG early career website.

Follow NSFG on Facebook and Twitter @NS_AGU!

1. AGU Updates

1.1 AGU Elections: Call for NSFG President-Elect and Secretary Nominations

Later this year, AGU will elect its next set of officers for the 2017–2018 term and the nomination process is now underway. We are looking for possible candidates for Near-Surface Focus Group President-Elect and Secretary. If you are interested in being considered or would like to nominate another member, please send an email to George Tsofliias. As you consider those opportunities, it will be helpful to review AGU's Strategic Plan and the leadership criteria and job description for Council members (Focus Group President and President-Elect serve on the AGU Council). The email should include some information about the possible candidate: name, job title, employer, AGU section/focus group affiliation(s), email and phone number, and link to website/CV, if possible. It would also be helpful to know why you are nominating yourself or the other member—what strengths do you think the nominee brings to the table?

Nominations should be submitted by 15 March.

1.2 Geophysical Survey Systems Inc. (GSSI) Student Research Grant Applications

The Geophysical Survey Systems Inc. (GSSI) Student Research Grant awards up to $2000 to AGU student members to support field geophysical research using ground-penetrating radar and electromagnetic methods. For more information visit the AGU research grants and awards page or the GSSI online application information or contact George Tsoflias.

1.3 AGU Honors Program Nominations

The AGU Honors Program recognizes individuals who have made outstanding contributions to the advancement of the geophysical sciences, to the service to the community, and to the public's understanding. Visit the AGU Honors Program online for opportunities to recognize deserving colleagues. Contact George Tsoflias, NSFG nominations committee chair, for more information.

1.4 AGU Thriving Earth Exchange

THRIVING EARTH EXCHANGE®
Powered by AGU

AGU's Thriving Earth Exchange is seeking volunteer climate scientists and climate adaptation experts to participate in facilitated online dialogues with local community leaders—dialogues that will help those leaders confidently and knowledgably lead resilience and adaptation planning efforts in their communities. This innovative pilot project, Resilience Dialogues, will take place in February through a customized online platform, giving Earth scientists a unique opportunity to lend their knowledge and expertise to civic leaders across the United States to aid in climate resilience efforts. Are you or someone in your professional network a good candidate for this volunteer effort?

Read more here!

1.5 Sexual Harassment in the Sciences

Issues of sexual harassment in the field, in the lab, and in the classroom have been widely covered in the news lately, as have the related issues of reporting, privacy, and the consequences. Unfortunately, this is not a new problem. Sexual harassment is part of a broader set of issues, which include gender bias and inequality, discrimination based on sexual orientation, race or ethnicity, and the safety and supportive nature of our workplaces and learning environments.

At the 2015 Fall Meeting, AGU hosted a Town Hall meeting **"Forward Focused Ethics—What is the Role of Scientific Societies in Responding to Harassment and Other Workplace Climate Issues?"** with the Association for Women Geoscientists (AWG) and the Earth Science Women's Network (ESWN). In addition to leaders from AGU, AWG, and ESWN guest speakers included Christine Williams, professor and chair of the Department of Sociology, University of Texas at Austin, an expert on gender, race, and class inequality in the workplace who has done extensive research on sexual harassment; Meg Urry, Israel Munson Professor of Physics and Astronomy, Yale University, director of the Yale Center for Astronomy and Astrophysics, and president of the American Astronomical Society (AAS); and Mary Anne Holmes, professor of practice in the Department of Earth and Atmospheric Sciences, University of Nebraska–Lincoln, and author of *Women in the Geosciences: Practical, Positive Practices Toward Parity*.

The speakers explored implicit bias in science and the multiplying effect that bias has on limiting professional advancement for women. They highlighted sexual assault and harassment in field camps and other field locations while discussing how diversity in the scientific workforce and social media have contributed to the current surge in reports.

If you missed the Town Hall, a video recording can be found on AGU On-Demand. When you log in, the video will be listed under the Science & Society channel.

AGU is undertaking several efforts on bringing our community together to address the issue of sexual harassment in science, and engagement with our community is needed. For more information go here, and share your thoughts by email.

1.6 Student Spotlights

Interested in being highlighted, or know a student who should be? Please email Sarah Morton for more information about the Student Spotlight. Take a look at this month's Student Spotlight on Adam Mangel at the end of the newsletter.

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2. Journal Information and Special Issue Call for Papers

2.1 *Journal of Environmental and Engineering Geophysics* Special Issue: Airborne Geophysics

Deadline for manuscript submission: 28 February 2016

The *Journal of Environmental and Engineering Geophysics* (JEEG) has announced a call for papers for a special issue on airborne geophysics. This issue is scheduled for publication in March 2017. The special issue coeditors are Antonio Menghini, Aarhus Geophysics, Denmark, and Les Beard, Zonge International, Arizona. Sponsorship of this issue is still open.

Suggested themes are

- New developments in equipment
- Novel airborne geophysical systems, including unmanned systems
- Data acquisition, modeling, and inversion
- Case histories, including
  - Hydrogeology, including soil salinity
  - Engineering
  - Ordnance detection
  - Environment
  - Mining
  - Exploration

International contributions are encouraged. The special issue will accommodate six to eight papers, but all accepted papers will be considered for publication in other JEEG issues.

Papers may be submitted through the JEEG submission site. Indicate in the cover letter that the paper is for consideration in the Airborne Geophysics special issue. The deadline for submissions is 28 February 2016.

Questions may be directed to
Special issue coeditors: Antonio Menghini and Les Beard
JEEG editor: Janet Simms

2.2 *The Leading Edge* Special Section: Hydrogeophysics

Deadline for manuscript submission: 15 May 2016

The Leading Edge (TLE) has announced the call for papers for a special section on hydrogeophysics scheduled for publication in September 2016. The special section will showcase applications of hydrogeophysics to quantitatively assess and monitor subsurface properties and processes. Contributions utilizing borehole, cross-hole, surface, and airborne methods to support the development and calibration of groundwater and contaminant transport models, monitor ecosystems, and sustainably manage groundwater resources are encouraged.

The paper submission deadline is 15 May 2016. Papers should be submitted directly to the guest editors below. Submissions guidelines for TLE are available online.

Guest editors: Rosemary Knight and Burke Minsley

Coordinating editor: John Lane

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3. Tech-Transfer Courses and Training

3.1 Short Courses Offered at Symposium on the Application of Geophysics to Engineering and Environmental Problems (SAGEEP) 2016

The Environmental and Engineering Geophysical Society announces four full-day short courses being offered at the SAGEEP 2016 conference at the Downtown Denver Marriott Hotel in Denver, Colo.

Sunday, 20 March 2016

SC1: geoDRONEology—A Short Course on Integrating Drones into the Geoscientific and Engineering Workflow
Presenters: Ronald S. Bell, senior geophysicist and president, Aerobotic Geophysical Systems, LLC; Rene A. Perez, senior hydrogeological consultant, Earth Forensics, Inc.

Multirotor and fixed-wing autonomous robotic aircraft, commonly known as "drones," are the latest technical innovation being applied to the acquisition of geospatial and geoscientific data for asset management, geological investigations, and environmental monitoring. This short course will provide you with up-to-date information on how to begin using small unmanned aircraft systems (sUAS) equipped with visible light and infrared cameras for surface investigations and magnetometers for subsurface site characterization. A strong emphasis is placed on the practical implementation of drones for photogrammetry, infrared and spectral imaging, and magnetometry through the use of numerous case histories. Recent changes in the rapidly evolving regulatory framework governing sUAS including the recommended best practices for legally operating drones for profit will be reviewed. There will be a "wrap-up discussion" on the several issues of concern including but not limited to (a) the implementation of detect and avoid technologies, (b) beyond line of site operations, (c) nighttime flights, and (d) drone swarms.

SC2: Ground Penetrating Radar—Principals, Practices and Processing
Presenter: Greg Johnston, Sensors & Software, Inc.

Ground penetrating radar (GPR) is a noninvasive subsurface exploration technique that has found widespread application in areas including near-surface geology (<100 meters), geotechnical and environmental surveys, mine safety, forensics, archaeology, utility location, concrete inspection, snow thickness measurements, and glaciology. This 1-day course will introduce the principles of GPR and GPR instrumentation, discuss survey design, provide hands-on data acquisition with a GPR system, and explore data interpretation (including common pitfalls), data processing, and data visualization in two and three dimensions. The course also includes case studies of common and not-so-common applications of the technology. No prerequisites required. Students will receive printed course notes and a memory stick with a PDF copy of a GPR textbook written by Dr. Peter Annan, the CEO and founder of Sensors & Software. Attendees need to come prepared to work for 2–3 hours outside and, if interested, to bring a PC-based laptop for the data processing portion of the course. The laptop should have GoogleEarth installed, if possible.

Thursday, 24 March 2016

SC3: Summit on Dams and Levees
Presenters: William Doll, Tetratech; Phil Sirles, Olson Engineering

It is now widely recognized that the infrastructure in the United States is in poor condition, and this is but one example of a larger global problem for public safety. Dams and levees, often constructed in an era of less stringent design and construction requirements, are among the infrastructure elements that are of great concern, particularly as populations increase and relocate in proximity to formerly remote dam and/or levee structures. Geophysics offers many tools that can be used for large-scale assessment

and internal imaging, as well as more localized subsurface material characterization of problem areas. Many geophysical and advanced monitoring methods have been developed and deployed and in countries throughout the world.

This forum on dams and levees is designed to bring together geophysicists from many countries to a common venue to share knowledge and experience, as well as discuss the future needs that our industry can provide for addressing this critical problem. The forum includes speakers from leaders in industry, government, and commercial application of state-of-the-practice methods and advancements to state of the art for imaging and monitoring small and large structures with remote/satellite, heliborne, driven, and handheld instruments, which can be deployed once or installed for monitoring these structures.

SC4: Satellite InSAR Data: Surface Deformation Monitoring from Space
Presenter: Alessandro Ferretti (special EAGE-sponsored EET course)

Satellite radar data for surface deformation monitoring are gaining increasing attention and not only within the oil and gas community. They provide a powerful tool for remotely measuring extremely small surface displacements over large areas and long periods of time, without requiring the installation of in situ equipment. However, apart from remote sensing and radar specialists, only a relatively small number of geoscientists and engineers understand how a radar sensor orbiting the Earth at about 7 km/s from 700 km above the Earth's surface can actually measure ground displacements of a fraction of a centimeter.

This course provides a step-by-step introduction to satellite radar sensors, synthetic aperture radar (SAR) imagery, SAR interferometry, and advanced interferometric synthetic aperture radar (InSAR) techniques. Rather than a tutorial for remote sensing specialists, the course starts from very basic concepts and explains in plain language the most important ideas related to SAR data processing and why geoscientists and engineers should take a vested interest in this new information source.

3.2 Multichannel Analysis of Surface Waves (MASW) Workshop

Dates: 3–4 March 2016
Registration cost: free
Location: Kansas Geological Survey, Lawrence, Kan.
Website

This free 2-day MASW workshop will provide an opportunity for geoprofessionals, geoscientists, and graduate students to gain knowledge about data acquisition, analysis, and interpretation of the seismic Rayleigh surface waves. The learning process will be facilitated by the use of SurfSeis software. The workshop is designed to address the current approaches for analyzing seismic data from both active and passive sources to obtain shear wave velocity (V_s) estimates for the near surface.

On day 1, a theoretical overview of the MASW method (active and passive) will be presented, participants will be familiarized with the SurfSeis software package, and field data acquisition from both active and passive sources is scheduled to take place (weather permitting).

Day 2 will continue with the theoretical MASW overview covering surface wave inversion, multimode interpretation and inversion, inversion sensitivity, use of a priori information, the quality of inversion results, and the latest advancements for dispersion curve imaging, such as the high-resolution linear radon transform, challenging dispersion curve patterns, and more. Seismic data acquired on day 1 will be analyzed. Participants are encouraged to bring samples of their own data for discussion, as time permits.

Attendees are expected to bring their own laptops.

4. Upcoming Conferences and Workshops

4.1 Meetings Overview

Meeting (click to go to website)	Location	Meeting Dates	Submission	Registration
2nd SEG/DGS Workshop: Near-Surface Modeling and Imaging	Manama, Bahrain	6–7 March 2016	*Closed*	Early registration ends: 4 February 2016
SAGEEP 2016	Denver, Colorado	20–24 March 2016	*Closed*	Early registration ends: 4 March 2016
EGU General Assembly	Vienna, Austria	17–22 April 2016	*Closed*	Early registration ends: 17 March 2016
4th International Workshop on Induced Polarization	Aarhus, Denmark	6–8 June 2016	15 February 2016	Early registration ends: 1 April 2016
Asia Oceania Geosciences Society 13th Annual Meeting	Beijing, China	31 July to 5 August 2016	19 February 2016	Early registration ends: 18 May 2016
ASEG 25th International Geophysical Conference and Exhibition	Adelaide, Australia	21–24 August 2016	1 March 2016	Early registration ends: 31 March 2016
EAGE Near Surface Geoscience 2016	Barcelona, Spain	4–8 September 2016	15 April 2016	Early registration ends: 15 July 2016
SEG International Exposition and 86th Annual Meeting	Dallas, Texas	16–21 October 2016	1 April 2016	Registration opens May 2016

4.2 Near Surface Investigation and Modeling for Groundwater Resources Assessment at the Asia Oceania Geosciences Society (AOGS) 13th Annual Meeting

Groundwater resources serve as a vital source of regional water supply. The lack of proper management of the available groundwater resources can lead to serious environmental issues such as land subsidence or seawater intrusion. Before sustainable management of groundwater resources can be established, it is required to have an accurate assessment of the groundwater system. This proposed session focuses on the assessment of groundwater resources with a focus on issues of near-surface investigation and modeling. This session welcomes studies related to numerical modeling and field investigation. Traditional hydrogeological approaches, geophysical approaches, and geochemical approaches are welcome. We especially encourage interdisciplinary studies that apply state-of-the-art hydrogeological and/or modeling approaches.

Conveners: Dr. Ping-Yu Chang (National Central University, Taiwan), Prof. Liang-Cheng Chang (National Chiao Tung University, Taiwan), Prof. Cheinway Hwang (National Chiao Tung University, Taiwan), Dr. Jui-Pin Tsai (University of Arizona, United States), Prof. Hwa-Lung Yu (National Taiwan University, Taiwan)

Invited Speaker: Yu-Feng Forrest Lin, hydrogeologist and assistant section head, Hydrogeology and Geophysics Section, Illinois State Geological Survey/Prairie Research Institute, University of Illinois at Urbana-Champaign

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5. Position Announcements

5.1 Postdoc position at Lancaster, U.K.

A postdoc position is available at Lancaster University (funded until December 2018) as part of the recently awarded Natural Environment Research Council (NERC) grant "Modeling and managing critical zone relationships between soil, water and ecosystem processes across the Loess Plateau." This is a result of a joint program between NERC and the National Natural Science Foundation of China (NSFC) to understand and seek ways to address the challenges faced for the delivery of China's ecosystems services in association with their agricultural production and urbanization.

The research associate based at Lancaster will primarily focus on numerical modeling soil water movement and nutrient transport in the deep unsaturated zone of the Loess Plateau in China. The researcher will be involved with experiments at the Chinese field sites, the data from which will be used to develop plot-scale, and, ultimately, watershed-scale, models. We anticipate extensive use of geophysical data (electrical resistivity, ground penetrating radar, etc.) to assist in plot-scale hydrological characterization.

More details of the post and application procedure can be found here.

Closing date 21 February 2016.

5.2 Faculty position in Geophysics at Stanford University

We invite applications for a tenure-track faculty position in the Department of Geophysics in any field of observational, experimental, computational, or theoretical geophysics. Priority will be given to the overall originality and promise of the candidate's work over any specific area of specialization. The appointment will likely be at the junior level (assistant or untenured associate professor).

We seek exceptional individuals who can develop a world-class program of research and have a strong commitment to both graduate and undergraduate teaching. A doctorate is required at the time of appointment.

How to Apply
Applications should include a cover letter, curriculum vitae, a statement of research and teaching interests, three recent publications, and the names and email addresses of three individuals from whom the search committee can request letters of reference. Please apply online. Review of applications will commence 1 December 2015. The position will remain open until filled. Questions related to your submission may be directed to csaplar@stanford.edu.

Contact
Csilla M. Csaplár
(650) 498-6877
csaplar@stanford.edu

Stanford University has a strong institutional commitment to the principle of diversity. In that spirit, we particularly encourage applications from women, members of ethnic minorities, and individuals with disabilities.

5.3 Associate Professor in Hydrogeophysics—Electric and Electromagnetic Methods at Aarhus University, Denmark

The Department of Geoscience, Aarhus University, invites applications for a permanent position in hydrogeophysics within electric and electromagnetic methods. The position is at the associate professor level.

We are eager to find the right person with drive and energy to further develop the research we are doing within electromagnetic geophysics. Applications cover the upper few hundred meters of the Earth and span from large-scale airborne electromagnetic mappings to small-scale permanent DC and IP monitoring of freezing and throw process. Our projects are worldwide.

Click here for more information on our research.

The full advertisement is here.

5.4 Postdoctoral Position at the U.S. Geological Survey, Storrs, Conn.

The U.S. Geological Survey (USGS), Office of Groundwater, Branch of Geophysics, anticipates an opening for a postdoctoral researcher in the area of hydrogeophysics. The purpose of this notice is to seek prospective applicants for this opportunity. The anticipated start date for this position is mid- to late 2016, pending final approval and funding availability.

The Branch of Geophysics engages in applied geophysics research and technology transfer related to groundwater resources. Current research initiatives at the Branch include application of geophysical methods to (1) characterize aquifer systems and properties controlling fluid flow and transport, (2) monitor natural and engineered hydrologic processes, (3) understand groundwater/surface water interaction, and (4) evaluate potential hydroecologic impacts of climate change. It is anticipated that the postdoc will work on one or more projects related to these topics and engage in fieldwork, data analysis, and publication of results. We are looking for candidates with strong quantitative skills, experience with geophysical forward and inverse modeling, programming ability in two or more computer languages, and experience with field and/or laboratory experiments. Candidates should have experience or course work in electrical and electromagnetic geophysical methods and hydrology.

The Branch of Geophysics is located on the University of Connecticut campus, in Storrs, Conn. The office's location on the UConn campus and in Connecticut's rural "Quiet Corner" provides for cultural opportunities, outdoor recreation, and easy access to Hartford (~30 minutes), Boston (~1.5 hours), and New York City (~2.5 hours).

If you are interested in knowing more about this position, please contact Fred Day-Lewis, John Lane, or Martin Briggs.

U.S. citizenship is required. The USGS is an Equal Opportunity Employer.

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6. Student Spotlight: Adam Mangel, Clemson University

Adam Mangel is working toward a May 2016 graduation with a Ph.D. from the Department of Environmental Engineering and Earth Sciences (EEES) at Clemson University. He is a Clemson Distinguished Graduate Fellow and Clemson EEES Environmental Scholar for his applied research in ground penetrating radar (GPR). Adam's work is driven by the world's thirst for water, one of humankind's greatest natural resources. Although water is readily available in some areas, clean water can be difficult to obtain given the continuing effects of anthropogenic and natural contaminants such as pesticides, fertilizers, and organic solvents. With this in mind, he has been motivated to advance GPR technology, which is noted for being noninvasive as well as an efficient data acquisition system.

Throughout his doctoral degree, Adam has created a clearer window into the subsurface, enabling him to more successfully image flow paths through the unsaturated zone where many of these contaminants reside. This work was most recently presented at the 2015 AGU Annual Meeting. One of his most notable papers, "High-Resolution Time-Lapse Monitoring of Unsaturated Flow Using Automated GPR Data Collection" (NS44A-03), discussed the development of a "GPR robot" that allows data to be collected up to 900 times faster than the conventional technique. This apparatus is equipped with a 1000-MHz antenna, mounted to a rail, and controlled by a desktop computer. Automated data acquisition using this system has incredibly simplified the ability to quickly create higher-resolution images of the subsurface. Thanks to this method, Adam has been able to more easily perform time-lapse monitoring of flow paths with incremental precision.

With the upcoming AGU–Society of Exploration Geophysicists joint hydrogeophysics workshop, Adam recalls his experience at the 2012 workshop hosted at Boise State University. Prior to the event, organizers invited attendees to investigate a cross-hole GPR data set for porosity information. At the time, Adam was early in his graduate career with minimal experience in borehole tomography. However, he decided to take a leap; he wrote his own program to process the data and presented his inversion results at the workshop, where he reluctantly received the "Worst Inversion Award." Discouraged at first, Adam quickly realized the value of this opportunity because this drew many attendees to his poster to discuss methods for improvement on his work, and he was also praised by the near-surface community for challenging himself. As valuable as success is in research, it can sometimes be more valuable to share with others methods that do not solve the problem at hand.

Through his experiences, the comradery within the near-surface community has motivated Adam to propel his research further with each AGU meeting he attends. He has acquired a passion for teaching and always looks forward to the conversations he'll have with new and seasoned colleagues inside and out of the Moscone Center in San Francisco. For those interested in his work or GPR hydrology applications or who are wondering where he got his incredible tie, feel free to contact Adam Mangel. Adam's other 2015 AGU papers include "Resolving Precipitation-Induced Water Content Profiles Through Inversion of Dispersive GPR Data" (H13E-1595) and "Time-Lapse Monitoring of Two-Dimensional Non-uniform Unsaturated Flow Processes Using Ground-Penetrating Radar" (H53C-1674).

To contribute material to the NSFG newsletter, send an email to Burke Minsley.

Deadline: Material must be received five full business days before the first of the month.

Guidelines for submissions: All members are welcome to submit content of interest to the near-surface community. Please keep messages brief and provide contact information and (if available) a Web address for additional information.

Get your message out to NSFG members faster.

You 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 who follow @NS_AGU will receive Twitter announcements, so make sure that you sign up!