

Geospectrum

Quarterly Geoscience Newsletter & E-Zine

Congressional Visits Day

Recap of the 5th annual Geo-CVD

Earth Science Literacy

And the Replacement of the
Geoscience Workforce

2013 Society Award Winners

Early Career Column

Fall Meetings Schedule



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Geospectrum

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GSA to Officially Support SEG Geoscientists Without Borders



Geoscientists Without Borders® (GWB) recently gained its first Society of America's (GSA) Council approved the partnership Memorandum of Agreement (MOA) at its recent meeting in Boulder, Colorado. The agreement was signed by both the GSA and the SEG Foundation.

This new agreement will effectively broaden the reach of GWB as well as leverage the opportunity and information access to GSA members. "We are particularly pleased to welcome the GSA to our GWB community. The GSA is an outstanding organization with a wide-ranging membership of enthusiastic geoscientists. Their community is warmly received," said SEG Foundation Chair Tom Smith.

As a Geoscientists Without Borders® Supporting Society, GSA will promote GWB in its publications and website; provide space and a special session at the GSA Annual Meeting; and also assist the SEG Foundation in finding potential investors in the GWB program. In turn, the SEG Foundation will recognize GSA at the SEG Annual Meeting in reference to GWB and also in The Leading Edge when GWB is featured. Additionally, GSA and the SEG Foundation will collaborate on publicity for the GWB.

"The Geological Society of America is pleased to have the

opportunity to act as an official Supporter of the Geoscientists Without Borders® humanitarian program. This is an excellent program and we hope that it will continue to grow and further extend its tremendous efforts around the world," said GSA Past-President John Geissman of the partnership.

Geoscientists Without Borders® is changing lives around the world. Four years ago, the program did not exist ... but today, 12 projects are in the field around the world and each of these projects is not only making a direct impact in those countries, but also impacting the reputation of geophysics around the world. The mission of GWB is to support humanitarian applications of geoscience around the world.

"We are building the bridge to the GSA. This is the first step, but this is how every voyage starts," said Geoscientists Without Borders® Chair Roel Snieder.

GWB was established by the SEG Foundation in 2008 with a US \$1 million leadership investment from Schlumberger. Geoscientists Without Borders® is transforming lives around the world by providing humanitarian application of geoscience solutions to global problems by connecting universities and industries with communities in need. Projects include the application of geophysical science, information and technology

to improve poor conditions or mitigate dangerous conditions and hazards. For more information on Geoscientists Without Borders®, please visit www.seg.org/gwb.

"Crowd-Sourcing": Looking at New Ways to Map Structures in Colorado

The U.S. Geological Survey is examining the restoration of its popular volunteer mapping program, The National Map Corps

In light of swiftly changing technical landscapes and increasing uses of social networking, the USGS is exploring a new approach to the volunteer program, and is launching a project to test options for volunteer participation in providing data to The National Map

The project involves mapping man-made structures and facilities, such as schools and fire stations, in the state of Colorado. Using an internet mapping application, volunteers can help the USGS update The National Map by correcting or adding information about structures.

"Even members of the public who can't tell a sandstone from a rhyolite but have internet access can now help the USGS keep its popular maps up to date through our new experiment in crowd sourcing," said USGS Director Marcia McNutt. "Correctly locating and identifying

fire stations, police stations, schools, and hospitals not only makes USGS maps more useful, but can literally save a life."

Over the past two decades, the USGS National Geospatial Program sponsored various forms of volunteer map data collection projects. Volunteers helped the USGS improve its maps during this period, by annotating paper maps, collecting data using GPS units, and submitting data using a web-based tool. However, in 2008, the volunteer mapping program was suspended as new methods for using volunteer data were being studied.

In recent years, new web- and mobile-based technologies have made it easier to create, combine, and share maps. Recent events have shown how well these technologies support the rapid and relevant production of geographic information.

If the Colorado pilot project is successful in attracting volunteers and capturing data for use in The National Map, the program may be expanded to other areas in the future.

This project offers volunteers an opportunity to participate in providing data to The National Map and US Topo map products. For more information, interested Colorado volunteers can visit <https://my.usgs.gov/confluence/display/nationalmapcorps/Home>

The National Map Corps: <http://nationalmap.gov/TheNationalMapCorps/>





AGI's booth at the 34th International Geological Congress in Brisbane, Australia.

AGI at the 34th International Geological Congress

This August marked the celebration of the 34th International Geological Congress (IGC) held in Brisbane, Australia. Hosted by the Australian Geoscience Council, the IGC was a truly global event with more than 5,000 delegates from more than 112 countries in attendance. Workshops, sessions, and special events were held throughout the conference, which featured topics such as mining and energy, as well as geology and geoscience education. AGI members and staff had the opportunity to travel to Brisbane for this special event to help promote international geoscience collaboration, and represent our prestigious member societies.

1. A number of our member societies took advantage of the opportunity to display informational and promotional materials in the AGI booth at the 34th IGC. Thank you to the American Association of Petroleum Geologists, the Association of American State Geologists,

the American Geophysical Union, the American Institute of Hydrology, the American Institute of Professional Geologists, the Environmental and Engineering Geophysical Society, the Geological Society of America, the Geological Society of London, the National Association of Geoscience Teachers, the Petroleum History Institute, and the Tri-Societies for displaying your materials with us! For more information, or to display materials with AGI at future conferences please contact Abby Seadler (aseadler@agiweb.org).

2. AGI, The Geological Society of America, the Geological Society of London, and the British Geological Survey sponsored a session and reception promoting the Global Geoscience Initiative (GGI). The goal of the GGI is to promote an inclusive and collaborative geoscience community, in which the socioeconomic and societal impacts of Earth science are brought to the forefront to attract the support of diverse scientific communities, funding agencies, governments, and other institutions. The GGI session at the 34th IGC featured discussants from the

Young Earth Scientists (YES) Network, and focused on fostering the next generation of geoscientists.

3. The YES Network – an international association of early-career geoscientists and affiliate of AGI – held its 2nd World Congress at the 34th IGC. The Congress included 6 sessions of roundtables that addressed issues such as engaging high school students in Earth science, and professional development. With the help of AGI staff in Alexandria, these roundtables were webcast live in order to increase participation around the world.

4. Sharon Tahirkheli, Information Systems Director for AGI, met with members of the Geoscience Australia to discuss the progress and improvements of AusGeoRef, the bibliographic geoscience database that covers Australian literature since 1840. Created in 2003, AusGeoRef, a spin-off of AGI's bibliographic database, GeoRef, includes more than 188,000 bibliographic references, and is updated on a weekly basis.

International EarthCache Day Helps Kick-Off ESW



The sixth annual International EarthCache Day returns on Sunday, October 14, to help kick-off Earth Science Week 2012. The public is invited to join the Geological Society of America (GSA), which runs the global EarthCache program, and AGI, which organizes Earth Science

Week, in exploring this exciting and educational Earth science experience.

International EarthCache Day is a time when EarthCachers around the globe organize small gatherings where people learn about the Earth. On this day, EarthCachers are also encouraged to visit EarthCaches and introduce EarthCaching to those who are not yet familiar with the program. An EarthCache is a place that people can discover with a GPS device while participating in a "treasure hunt" called geocaching. "The treasure you find at an EarthCache is a lesson about the Earth itself," says EarthCaching Director Gary Lewis of GSA, a longtime Earth Science Week partner.

EarthCache events are being held around the world on October 14, in Spain, Portugal, Canada, the United Kingdom, the United States, and elsewhere. For information about International EarthCache Day events, and for more details about EarthCaching, visit www.earthcache.org, www.facebook.com/earthcache, or contact earthcache@geosociety.org.

This year, International EarthCache Day follows on the heels of the highly successful First Annual International EarthCache Mega Event, which took place on September 2, 2012, in New Gloucester, Maine. This event hosted over 700 participants from around the globe who came together to celebrate, learn more about, and advance the global EarthCaching program. The Second Annual International EarthCache Mega Event is scheduled for September 7, 2013, in St. George, Utah, an area surrounded by wonderful geology and a number of great EarthCaches.

New Research Reveals Desert Ecosystems Depend on Soil Crusts

Chris Zimmerman
SSSA Soil Horizons (2012)



Across the western United States, deserts creep outward in all directions. Dry winds shuttle clouds of sand across the landscape, leading a charge to take over surrounding land and advance a growing desertification problem.

The key to restoring these arid environments and preventing further desertification may exist on the surface of the desert itself. Biological soil crusts (BSC) are a complex blend of several microorganisms that carpet arid environments. These organisms fuse with soil particles, stabilizing desert crusts and forming fragile peaks in the soil that influence a variety of processes that allocate important resources.

“These crusts kind of act like a living mulch across a desert, protecting the surface from erosion,” says American Society of Agronomy and Soil Science Society of America Member Mandy Williams, a lab manager in the school of Life Science at the University of

Nevada – Las Vegas. “Once you disturb the soil surface, you’re more likely to lose what little resources are available there.”

Williams, along with two other UNLV researchers, performed an in-depth micromorphological investigation of BSC samples from the Mojave Desert to better understand their formation, structure, and the significant roles they play in arid environments. Their findings reveal complex internal soil structures that suggest a rich genetic history and a variety of formation processes.

The development of BSC begins with cyanobacteria, a group of photosynthetic bacteria. These bacteria form smooth algal crusts on the desert surface that strengthen soil structure and seal off the surface to erosion effects.

Wet-dry cycles cause this newly formed soil crust to expand and contract, leaving cracks in the crust that trap dust as it blows over the desert surface. Dust is an important source of nutrients in the Mojave Desert, where organic matter is lacking and much-needed nutrients must migrate to the desert from surrounding environments.

Meanwhile, cyanobacteria weave around particles in the soil, forming thick layers of fine grains by trapping sediments in their sticky casing. Over many years, these bacteria-soil mixtures grow into jagged micro-peaks that accrete more dust and continue to evolve. These peaks are extremely fragile and sensitive to physical impacts such as vehicles, foot traffic, and grazing.

BSCs also have implications on water distribution in arid environments. In the Av soil horizon, a thin layer on the



A tall, pinnacled biological soil crust with extensive growth of lichens in the Mohave Desert, USA.

desert surface where fine dust particles settle, pockets of air form beneath the soil. These cavities trap water at the surface to be used by soil microbes and desert plants when it’s needed most.

The recovery of these valuable BSCs after disturbance ranges from 10s to 1000s of years, depending on several environmental factors. “I think the real emphasis that should come out of these large timescales is to keep the crust intact in the first place,” says Williams. “If nothing else, it should give us an even bigger reason to protect soil crust.”

Williams says there are ideas floating around in the scientific community of ways to encourage the reformation of damaged BSCs in arid environments. One involves restoring the fine-grained Av horizon and introducing microorganisms that can begin the crust formation process. However, not much can be done currently to reestablish damaged BSC.

“Soil crusts play an active role in dust capture as well as the formation of important biosedimentary features that influence surface hydrology

and the allocation of resources,” says Williams. “These crusts form important features that must be considered not only for the restoration of crusts but entire desert ecosystems in the future.”

IRIS/SSA 2013 Distinguished Lectureship

Dr. Lara Wagner, Assistant Professor of Seismology and Tectonics at the University of North Carolina, Chapel Hill and Dr. Gavin Hayes, U.S. Geological Survey, National Earthquake Information Center, have been selected for the eleventh annual IRIS/SSA Distinguished Lecture Series. The lecturers will be presenting talks aimed at general public audiences throughout 2013. More information will soon be available in the Distinguished Lectureship section of the IRIS website.

http://www.iris.edu/hq/programs/education_and_outreach/distinguished_lectureship



Mandy Williams and fellow researcher Brenda Buck in their UNLV laboratory.

Call for Abstracts for AAPG annual convention



Abstracts are now being accepted for the American Association of Petroleum

Geologists 2013 Annual Convention & Exhibition (ACE). Industry professionals and students are invited to submit abstracts that relate to the 11 themes proposed by the technical program committee:

- » Global Unconventional Resources
- » The Appalachian Basin – A Re-Emerging Giant
- » Emerging Conventional Frontiers
- » Active Conventional Oil and Gas Fields
- » Siliciclastics
- » Carbonates and Evaporites
- » Energy and the Environment
- » Analysis of Petroleum Systems
- » Structural Geology and Seismology
- » Geophysics and Seismology
- » E&P Technology and Research – The Past and the Future

Papers should be submitted online at <http://aapg2013ace.abstractcentral.com/> by 11 October 2012.

The AAPG 2013 ACE organizing committee is led by General Chair Mike Canich, Sylvan Energy, LLC; General Vice Chair Dan Billman, Billman Geologic Consultants; and Technical Program Chair Tim Carr, West Virginia University.

A Sustainability Index for Karst Environments



Philp Van Beynen, Robert Brinkmann, and Kaya Van Beynen

This abstract was reprinted from the NSS Journal of Cave and Karst Studies. To view the article in its entirety please visit the NSS website or click [here](#).

Abstract: With growing populations and ever increasing pressure on resources, the need to live sustainably with our environment has increased in significance. When considering such anthropogenic pressures, karst landscapes are as vulnerable, if not more so, than any other environment. Such vulnerability arises from the rapid transit times of percolating water, the poor filtering ability of carbonate bedrock, and the highly specialized biota of subterranean karst. The Karst Sustainability Index (KSI) was created as a standardized metric of sustainable development practices in karst settings. The KSI uses predetermined targets to ascertain the overall sustainability of a karst region. Indicators are designed to incorporate common measures of sustainability for the three domains of social, environmental, and economic resource use. Benchmarking the current state of karst environments allows the comparison of sustainability practices temporally and spatially to highlight areas where remedial policies or actions are needed. This is the

first index to incorporate the emerging field of environmental sustainability with karst landscape assessment. To test the applicability of the KSI, a study was undertaken in the Tampa Bay Metropolitan Area, which encompasses four counties that are entirely karst. The TBMA was found to be progressing towards the sustainable management of karst resources, and the KSI provided a robust measure of sustainability.

Call for Papers: Unconventional Resources Technology Conference



Organizers for the Unconventional Resources Technology Conference (URTeC) have issued a Call for Papers for petroleum engineers, geologists, geophysicists and other professionals interested in sharing innovations, best practices and experiences in integrated approaches for North American unconventional resource plays. Papers are being accepted through 15 November at www.URTeC.org.

URTeC, 12-14 August 2013 at the Colorado Convention Center in Denver, will for the first time bring together the key disciplines and technologies engaged in the development of North American resource plays. The program includes 20 themes applicable to unconventional resources and appeals to engineers, geologists

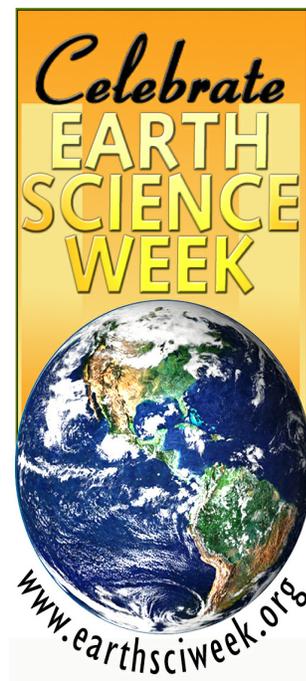
and geophysicists, including:

- » Unconventional Project Development
- » Unconventional Shale Plays
- » Flow Mechanics in Tight Reservoirs
- » Laboratory Methodologies
- » Reservoir Monitoring
- » Drilling Optimization

A complete list of topics and the Call for Papers is available online at www.URTeC.org.

Authors whose papers are accepted will present at a conference supported by three of the world's largest scientific associations — SPE (Society of Petroleum Engineers), AAPG (American Association of Petroleum Geologists) and SEG (Society of Exploration Geophysicists).

For more information and/or to request information on exhibiting and sponsoring visit the URTeC website at www.urtec.org.



A GSA GeoCorps Experience at Bryce Canyon National Park

Alexander Crawford

The following article summarizes the GeoCorps America experience of Alexander Crawford, who worked as a "Park Guide/Planetologist" at Bryce Canyon National Park, Utah, during the summer of 2012. Alex's work was supported through a partnership between the Geological Society of America's GeoCorps America program, in partnership with the National Park Service. Nearly 100 new GeoCorps opportunities for the summer of 2013 will be posted on December 1, 2012, at www.geosociety.org/geocorps. For more information, contact Matt Dawson, at mdawson@geosociety.org, 303-357-1025.

Why is Bryce Canyon a national park? I asked this question while constructing a geology talk as part of my summer internship through GSA's GeoCorps America program. As I considered this question, I couldn't help but compare Bryce to other national parks. The Grand Canyon, for instance, is obvious. The biggest canyon in the world? Of course it should be a national park; it's the biggest! Likewise, the tallest trees are preserved in the Redwoods, the greatest array of limestone caves is preserved in Great Basin, the tallest peak in the USA is preserved in Denali.

But what about Bryce? It is not exceptionally deep or tall. It doesn't have great biodiversity or cultural history. So why is it a national park? It's really weird. Bryce is bizarre. Cycles of freezing and thawing currently conspire to erode

the edge of the Paunsaugut Plateau; they have carved out an amphitheater abounding with gnarled rocky pinnacles called hoodoos. These twisted, tortured towers are grotesque and weird, and as Clarence Dutton noted back in the 1870s, they may be repulsive at first glance. Even the word "hoodoo" means "oddly shaped column of rock" or, alternatively, "black magic". And magical may be a better descriptive, for truly this land is enchanting, and given time, the trained eye will come to appreciate the beauty in the strangeness.

The impure limestone of the Claron Formation is the major constituent of the park. Formed between 55 and 35 million years ago in a large lake basin (or series of basins, more likely), the Claron limestone is mottled with varying amounts of sand and silt and silica mud from mountain streams carrying the red terrigenous material into the limey lakes. Below the hoodoos are grey hills and short cliffs of sandstone, mudstone, siltstone, and coal from the Cretaceous. These recall a time when Bryce was covered intermittently by an ocean, beach, or coastal swamp. Pinyon-juniper forests dominate the bottom of the amphitheater, while the rim transitions from ponderosa stands in north (around 7500 to 8000 feet in elevation) to fir forests at the southern end (around 9000 feet).

But there is another aspect of Bryce that in recent years has become almost as prominent as the geology. Bryce is one of the last sanctuaries of darkness remaining in the USA. Its remoteness is a boon to astronomers and amateur stargazers alike because of the lack of light pollution,



the dry climate, and the expansive vistas. And it was the astronomy that brought me to Bryce. For although my job description included plenty of geology, my job title was planetologist.

Tuesdays, Thursdays, and Saturdays are astronomy days for Bryce Canyon. During the day, the interpretation crew operates solar scopes to view solar prominences and sunspots, and at night there are multimedia presentations on an astronomy topic followed by two hours of telescope viewing of the night sky. I had telescope duties at least once and usually twice each week. My specialty is planetary studies, so more often than not I pointed my scope at Saturn or Mars, both of which were easily visible throughout the summer. Later in the evening, I'd turn the scope to a galaxy, nebula, or star cluster, all the while sharing factual and colloquial information about the objects that visitors see. Also popular are constellation tours, which Bryce rangers take very seriously. No tour is completed by simply pointing out a set of stars. Rather, a Bryce ranger will spend time on the legends surrounding each constellation and ponder with visitors the different ways to visualize them. I was thrilled

when my supervisor deemed me ready to give a tour and was sure to double-check my stories before presenting.

[One] major project for me while at Bryce was to construct two different programs to present for visitors. My first was a 30-minute geology talk. Since I developed it early on, I was able to tweak the geology talk several times, try different techniques, and experience many of the challenges that can come with interpreting for the public.

My greatest pride, though, came from the completion and presentation of an hour-long evening program about time. The presentation focused on the human perception of time from multiple places, eras, and professions. I included explanations about the construction of calendars and about the implications of linear, circular, and relative time for the human experience. Bryce offers cultural examples of timekeeping in the Paiute tribe, as well as a great backdrop for discussing geologic time and cosmic time. Time is also a fascinating topic to which anyone can relate, and for those reasons I was very excited about the opportunity.

Before my experience at Bryce, I expected that I'd spend five or six years obtaining

a PhD and then seek out an academic post somewhere in the collegiate world. But by the end of the summer, I (*continued*) couldn't help but notice how enjoyable and fulfilling being a park ranger can be. Although I'm happy to be in grad school this fall, I did discuss briefly some possibilities for future work at national parks, both at Bryce and elsewhere, with my supervisor and other rangers. I'd love to apply for a seasonal post next summer depending on my responsibilities here at school. I feel well prepared for a position at any national park, and especially with night sky programs. And if nothing else, I now have a different perspective on sharing the world with others than the standard academic viewpoint. I hope that makes me more flexible in teaching over the next few years.

Update from the Clay Minerals Society (CMS)

David Laird
President, CMS
dalaird@iastate.edu



"Shales and Imposters" was the theme of the 49th annual meeting of The Clay Minerals Society held at the Colorado School of Mines in Golden, Colorado, July 7-11, 2012. The conference, organized by Manika Prasad and her colleagues, featured a coordinated pre-conference workshop focusing on Organic Rich Rocks, a Sunday field

trip to visit organic rich rock outcrops, and theme sessions on Pore-systems in Organic Shales and Clay Diagenesis and Organic Maturity. The restaurants of lovely downtown Golden and the excellent conference facilities on the nearby Colorado School of Mines campus provided fertile ground for interdisciplinary discussions relating clay mineralogy, diagenesis, rock structure and surface chemistry to the formation and potential availability of hydrocarbons in organic shales. Clearly, clay science is foundational to the rapidly growing industry of extracting energy resources from organic shales. Other highlights of the meetings included a symposium organized by Lynda Williams on Clays and Human Health, during which there was much discussion on the mode of action of antibacterial clays and the impact of clays mixed with animal feed on the fate and toxicity of aflatoxins. An intriguing symposium on Multi-Scale Modeling of Clays and Layered Minerals organized by Jeff Greathouse and Chris Greenwall provided a state-of-the-art *ab initio* view of clay surface chemistry, hydration, swelling and interactions of clays with PAHs, supercritical CO₂, and CO₂ nanodroplets in deep saline aquifers. The latter work helps establish a theoretical foundation for the geological sequestration of CO₂. David Bish described the miniature transmission X-Ray diffractometer that is aboard Curiosity, NASA's exciting new Mars rover. If all works well, the first diffraction patterns of clay minerals in Martian soils will be arriving on earth later this year.

Dr. Jeffery Post, Research

Geologist, Department of Mineral Sciences, National Museum of Natural History at the Smithsonian Institution, was the 2012 recipient of the Marion L. and Chrystie M. Jackson Mid-Career Clay Scientist Award. Dr. Post gave us a fascinating tour of the dark world of manganese oxides in a lecture titled "Unraveling Manganese Oxides – Tales from the Dark Side of Mineralogy." Often fine-grained and black in color, Mn-oxides have drawn little attention, yet the more than 30 redox active Mn-oxide phases play a crucial and biologically mediated role in soils and sediments. Dr. Post and his many collaborators have brought together X-ray and neutron diffraction, computer modeling, spectroscopy, and time resolved synchrotron X-ray diffraction techniques to unravel structure and reactivity of this family of fascinating minerals. In particular, he focused on todorokite and woodruffite, which are manganese-containing octahedral sieves. Additionally, electron density maps of Na- and K-birnessite interlayer regions clearly show changes in ion coordination environments during ion exchange processes.

Dr. Akihiko Yamagishi, Professor in the Department of Chemistry, Toho University, Chiba Japan, was the recipient of the Marilyn and Sturges W. Bailey Distinguished Member Award. The Bailey Award is the highest honor of The Clay Minerals Society, and is awarded solely for scientific eminence in clay mineralogy as evidenced by the publication of outstanding original scientific research and by the impact of this research on the clay sciences. In his lecture titled "Stereochemistry and

Molecular Recognition on a Clay Surface," Dr. Yamagishi began with an appeal to his colleagues for help in finding a way to deal with Cs137 and other radionuclides released into the soils of Japan in the wake of the Fukushima nuclear disaster. Dr. Yamagishi then reviewed his well-known work on synthesis and use of chiral clays and on Langmuir-Blodgett films of clays. Chiral clays can simply be prepared by exchange of chiral transition metal ion complexes of the right size and charge. These chiral clays specifically interact with chiral molecules, thus leading to applications such as chiral separation and chiral catalysis.

It has been an honor for me to serve as CMS president this past year. My job was made easy by the dedicated staff at the CMS Society office in Chantilly, Virginia. I offer my sincere thanks to Mary, Alex and Gordon for all their help. I also want to thank members of the CMS Executive Committee for their dedication to clay science and to our society. Finally, it is my honor to introduce Dr. Peter Komadel, the new CMS president from the Slovak Academy of Sciences, Institute of Inorganic Chemistry in Bratislava, Slovakia. Dr. Komadel will be writing this column and guiding our society forward through our 50th anniversary celebration at the University of Illinois in Urbana-Champaign, October 6-10, 2013.

Fracking's Footprint: Scientists Study Impact of Shale Gas Development on Pennsylvania's Forests and Soils

Madeline Fisher
SSSA Soil Horizons (2012)



Travel the length and breadth of Pennsylvania and you'll notice a divide that has defined the state from the start: The southeast is settled and wealthy farm country, while the less prosperous north and west have always depended on boom and bust cycles of resource extraction. Nearly all of Pennsylvania was clear-cut in the late 1800s and early 1900s, making it for a time the United States' largest producer of lumber. Underground coal mining began even earlier, followed by surface strip-mining in the 20th century. Oil and gas production have also flourished here; since 1859 more than 325,000 wells have been drilled.

Now the latest boom is on. Thousands of feet below the surface are the Marcellus and Utica shales, and their largely untapped reserves of natural gas.

For decades, geologists have

known about the fuel stored in deep rock formations such as the Marcellus, which runs beneath Pennsylvania, New York, West Virginia, and other Appalachian states. But extracting it wasn't economical until the advent of horizontal drilling and the controversial technique known as hydraulic fracturing, or fracking. In the latter process, millions of gallons of pressurized water, sand, and chemicals are injected deep into the earth to fracture the shale and release the trapped gas.

Since 2004, nearly 3,000 shale gas wells have been drilled in Pennsylvania, which is still just a tiny fraction of the state's conventional oil and gas wells. But because shale gas is so deep and extracting it means handling massive amounts of water, much more infrastructure is involved than in conventional drilling—creating a much bigger footprint as a result, says Pennsylvania State University assistant soil science professor and Soil Science Society of America member, Patrick Drohan.

"I could see right away when I saw my first Marcellus gas pad," he says, "that this would be something that would change Pennsylvania's landscape unlike anything the state has seen in well over 50 years."

To support the drilling of a 5,000-foot-deep well and the fracking process that follows, engineers must build a raised, gravel pad of three to five acres in size, and a stormwater system to handle the resulting runoff. New roads to the drill pad are needed, as are compressor stations for pumping the gas and pipelines to carry it away. And because most of the pressurized water comes back up once hydraulic fracturing is finished, flow-back water storage ponds and treatment facilities must be constructed, as well.

But the vast landscape changes produced by shale gas development are poorly understood, which is why Drohan, Penn State wildlife ecologist Margaret Brittingham, and others are now working to shed some much-needed scientific light on the process. Their first goal has been to characterize the Pennsylvanian landscapes where development is occurring: where the activity is concentrated, what the topography and soils are like, whether the land cover is agriculture or forest.

They then hope their data can inform the siting of future wells, pipelines, and roads so this infrastructure causes the least disturbance in the short term, and eases the way toward bringing back farmland and forest later on.

Some of the most beloved



A pad access road in Pennsylvania.



Pipeline construction in Pennsylvania.



Pennsylvania's Pine Creek Gorge.

forests in the state are found in and around Pine Creek Gorge, known as the Grand Canyon of Pennsylvania. The site's expanse of trees is also among the last unbroken, "core" forest in the state and across the entire northeastern United States, as well.

It may not remain so, however. Drohan and Brittingham's work suggests that nearly 25% of Pennsylvania gas pads are being built in core forest areas, including those near Pine Creek, where at least one well rig now towers above the hills and trees. All told, some 1700 acres of core forest could be lost to gas development, according to the scientists'



A gas pad in Pennsylvania.

Fifth Annual Geosciences Congressional Visits Day

September 11-12, 2012

The American Geosciences Institute (AGI), the American Geophysical Union (AGU), the Geological Society of America (GSA), the American Association of Petroleum Geologists (AAPG), the Soil Science Society of America (SSSA), the American Meteorological Society (AMS) and the University Corporation for Atmospheric Research (UCAR) hosted the Fifth Annual Geosciences Congressional Visits Day on September 11-12, 2012. 44 geoscientists from 20 states converged on Capitol Hill in support of geosciences research and development (R&D) and geosciences education.

Participants began with a half-day workshop on the recent activities of Congress, status of the federal budget, and tips for successful visits. Bess Evans from the White House Office of Science and Technology Policy gave a presentation on the sequestration and its estimated impact on science funding

while current geosciences congressional fellows spoke to the participants about working in a congressional office.

Once the participants were given their schedules for Wednesday's visits, they got a chance to review the "leave-behinds" and "one-pagers" in the folders that they would be handing out to policymakers. The participants practiced conducting a congressional visit and honed their message.

Wednesday was a full day of congressional visits for the participants. There were at least 100 visits with congressional offices and a few informal visits were set-up while the geoscientists were in the congressional buildings. They met mostly with staffers in the personal offices of their district representative and the senators of their state. Some visited with the offices of other representatives from nearby districts or with professional staff members from various House and Senate committees. There were 17 meetings scheduled for the geoscientists to meet directly with their representatives (5 senators and 12 representatives from 13 states). The members were generous with their time and expressed interest in a variety of geoscience topics.

The participants discussed the value of geoscience in keeping the U.S. competitive, ensuring secure energy, water, and mineral resources, sustaining and maintaining the environment, supplying a skilled geoscience workforce, and preparing for and responding to hazards while mitigating losses. In doing so, the participants stressed the importance of maintaining funding for the federal science agencies. They had opportunities to discuss topics of personal importance to them, such as energy resources, water management, and science, technology, engineering, and math (STEM) education. They made sure to emphasize the economic benefits that their work brings to their states and districts, as well as the scientific and technical advances.

Policymakers were happy to hear from their constituencies and especially from geoscientists. Many members of Congress, on both sides of the aisle, support the geosciences because of the scientists' role in reacting to natural disasters, cultivating energy resources, and educating the workforce of the next generation.

After visiting with over 100 offices, the participants attended the United States Geological Survey Coalition Reception in Rayburn House Office Building. The USGS Coalition is an alliance of over 70 organizations that champion USGS programs. It annually recognizes lawmakers for their support of the agency by presenting Leadership Awards at the reception. This year's award winners were Representative Betty McCollum (D-MN) and Representative Steven

LaTourette (R-OH). McCollum and LaTourette



USGS Coalition Leadership Award winners Rep. Betty McCollum of Minnesota with Harvey Thorleifson, Director of the Minnesota Geological Survey



Sen. Jeff Merkley of Oregon listens to Geo-CVD participant Jeff Rubin as he describes the benefits of the geosciences to society.

serve on the House Appropriations Subcommittee on Interior, Environment, and Related Agencies, which oversees funding for the USGS and other Department of the Interior programs.

After returning home, the participants sent thank-you emails to the congressional staff they met with and followed up on any questions they were asked. This important correspondence allows them to maintain a relationship with their congressional delegation and serve as a non-partisan source of scientific information. Geoscience is critical to addressing society's most pressing needs, such as adapting to a changing climate, ensuring adequate supplies of clean water, and producing energy, and they can provide a valuable service to policy makers.



Geo-CVD participant Bradley Worley "talks geo" with Sen. Kay Hagan of North Carolina. Sen. Hagan's daughter is a geologist.

Geology and Stephen King

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The use of geology and geologists by fiction writers has been ongoing



since the late 1800s. The following table summarizes the more well known stories where geology and its practitioners have played a part, for good or ill, in various crimes and plots that include mining swindles, murder, scientific intrigue, high treason, and the end of the world.

There are numerous other

stories where geologists play a role, but I limited the above list to those authors where geology makes regular appearances or is involved in a meaningful way in the story line.

One of the author's who has incorporated geology into many of his tales is Stephen King. Although not thought of as an action adventure writer,

King's use of geology is subtle, yet pervasive. For example, in King's novella Rita Hayworth and Shawshank Redemption, geology plays an important part in the mechanics of the story as well as in describing the attitude of the main character to his long prison term. Quoting Red, the story's narrator: "Geology is (*continued*)

Geologists as Fictional Characters

Author/Year	Character	Works	Comment
Conan Doyle, Sir Author late 1880s to early 1900s	Sherlock Holmes	A long bibliography of novels and short stories. Conan Doyle non-Holmes work The Lost World (1912) describes the competing views of Victorian-age paleontology and evolution.	Holmes expertise in geology is introduced in A Study in Scarlet (1887) in Watson's famous line "...Knowledge of Geology. Practical, but limited." This characterization certainly describes my own capabilities and, to one extent or the other, probably most other geologists as well. Geology is highlighted further in several other stories (e.g., The Sign of Four (1890) and The Five Orange Pips (1904).
Freeman, R. Austin 1916 though 1925	John Thorndyke	John Thorndyke's Cases (1916); The Shadows of the Wolf (1925); and The Puzzle Lock (1925)	The use of foraminifera, pollenite, and eolian sand to track down murderers and other assorted miscreants.
Upfield, Arthur William 1928-1961	Inspector Napoleon Bonaparte (Bony)	Over 20 mystery novels set in the Australian outback. Although not a geologist, Bony regularly interacts with, arrests, and investigates geoscientists and their nefarious doings.	Gritty tales that bring to life post-World War I Australia. The main character struggles to overcome the racial and cultural stereotypes that exist even in one of the most remote parts of the world.
Andrews, Sarah 1984 to present	Em Hanson	11 forensic geology fiction novels and numerous other non-fiction publications about the geologist as mystery writer	Em Hanson is not an easy character to like and her frequent emotional battles with family, friends, lovers, and employers makes me wonder why anyone would want to hang out with her.
DuBrul, Jack 1998 to present	Philip Mercer	Seven action adventure novels with geology and geologists as integral plot components	Brings to mind Clive Cussler's Dirk Pitt. Who knew there were so many ways for a geologist to save the world from total destruction?
Miller, Susan Cummins 2002 to present	Frankie MacFarlane	Five geo-sleuth novels focused on research projects that somehow regularly intercalate with murder	Field work is the setting for these stories and the author has a great feel for what it is like to be a working geologist.

the study of pressure and time. That's all it takes really... pressure... and time... That, and a big goddamn poster."

Geology in the Works of Stephen King

Stephen King (1947-) is one of the most prolific, popular, and critically well-regarded writers in the United States and perhaps the world. He has written 50 novels (2011 count), five non-fiction books, and nine short story collections. King also has produced, appeared in, and adapted movie and television screenplays for at least nine of his works. He is a semi-accomplished musician and lives a relatively private, quiet life in Bangor, Maine. I have been a fan and avid reader of his fiction and non-fiction work since the late 1970s when, in a snow bound Cleveland airport coming back from my first field assignment as a working geologist, I picked up a copy of *The Stand*. This 1,300-page thriller about the battle between good and evil in a post-apocalyptic America, where the Rocky Mountains play a key part in the final scene, kept me enthralled and occupied through the enforced 18 hour lay-over at a crowded and chaotic airport.

I re-discovered King this past summer, during a period of forced convalescence after a minor health scare, when I had the chance to re-read several of his books. In doing so, I was struck by how much geology and geologic processes contribute to King's story lines and character development. Possibly his roots in rural Maine, a state where geology dominates the landscape and many parts of the economy, have sensitized King to the

influence earth features can have in real-life's routine, and fiction's extraordinary events.

King's integration of geology into his stories and characters is worth examining for several reasons. Given the wide reach of his novels and short story collections (over 350 million copies sold), King's work regularly makes most bestsellers lists. His use of geology exposes the public to our profession in ways only slightly less dramatic than major earthquakes and tsunamis. It is therefore worthwhile to check on the accuracy or reliability of King's terminology and earth science. In addition, the integrity of King's geology is an important literary factor in the credibility (i.e., readability) of his stories. Part of the value of Isaac Asimov's and Kim Stanley Robinson's books were that they were (generally) consistent with the physics and technology of interplanetary space travel and therefore, believable. The same test holds true for King's geologic fiction: to be plausible it must be, more or less, technically reliable.

Reading fiction involves suspending reality and King's tales usually start or take place in worlds that look very much like ours. This necessary deferral of the everyday by the reader is less burdensome and more enjoyable if the author can provide a realistic framework in which the characters operate and the plot naturally develops. Authentic geology is an important, and in some of the stories, a crucial component of the worlds King fabricates and asks his "Constant Reader" to join him in for a little while.

I chose two of King's writings that illustrate his relationship with geology: *Desperation* (1996 - Penguin) and the seven

volume *Dark Tower* series (various publishers, 1982-2004). *Desperation* is set in Arizona at a recently reopened porphyry copper mine that has a tragic past, the China Pit. Unfortunately for the people of the small town of *Desperation*, the mining company taps into more than finely disseminated native copper in a quartz monzonite groundmass when they unseal a 100 year old adit. The *Dark Tower* series, King's self described *Jupiter* - because it dwarfs all of his other work - is a travelogue of five unlikely companions' search for and discovery of the *Dark Tower*, the actual and metaphorical nexus of all universes. The value of the *Dark Tower* series in illustrating King's relationship with geology is that much of the story involves the characters walking west across a rough approximation of the United States, in intimate contact with the land and terrain. During this trip and, to a lesser extent in *Desperation*, King uses geology in three ways to advance the story line: (a) as a descriptor that sets the stage or tone for a current or upcoming scene; (b) as a plot device that enables or contributes to the actions of protagonists and antagonists; and (c) as a connector that joins the story's reality to alternate universes or supernatural worlds.

N.B. For those of you not familiar with King's characters and their special vocabulary, I have included a short explanation of terms, offset by brackets [].

Geology as a Descriptor

At the beginning of *Basin and Range*, John McPhee calls geology a descriptive science

and "...a fountain of metaphor". He provides several examples of how geologists name things "...in a manner that sent shivers through the bones". King's vivid accounts of the landscapes in *Desperation* and the *Dark Tower* books confirm McPhee's nonfiction observations. Recalling the development of *Rattlesnake Number One*, part of the *China Pit* - the porphyry copper mine in *Desperation*, Arizona where the story of the same name takes place - the fictional narrator says:

"The ground where they sank *Rattlesnake Number One* had a good vein of gold, but mostly it was hornfels- cooked shale. You could snap a piece of it in your hands, and when the mine got down seventy feet and the men could hear the walls groaning and squeaking around them, they decided enough was enough."

However, after the inevitable cave in, King's geology becomes more specific:

"The roof fell in about sixty feet from the adit...The miners got up that far from below, and there they were stopped by twenty feet of fallen hornfels, skarn, and Devonian shale."

King accurately describes the mine workings and some half-hearted rescue efforts and these realistic portrayals establish a convincing backdrop for the development of the story line and characters. By the end of the book, most readers have a trustworthy image of an open pit, porphyry copper mine.

One of the more extensive uses of descriptive geology by King is in Book IV of the *Dark Tower* series: *Wizard and Glass*. Here he creates an intricate setting that weaves together an oil field, a box canyon, a fault scarp, and a red rock. In one of the (*continued*)

final, climatic scenes, the protagonists have successfully lured the bad guys into a box canyon and now watch their destruction from a geologically advantageous position:

“Cuthbert was closest to the top of the canyon’s wall, then Alain, then Roland, standing on a six inch shelf of rock and holding an outcrop just above him. From their vantage-point they could see what the men struggling in their smoky hell below them could not: that the thinny [monster] was growing, reaching out, crawling eagerly toward them like an incoming tide.”

Geology run riot is on display in Book III of King’s Dark Tower Series: *The Waste Lands*. Trapped on a high speed, futuristic train operated by a maniacal and suicidal robot named Blaine (after a former Maine governor and presidential candidate? See <http://digitalhistory.uh.edu> for some background information on Blaine and try Nancy McPhee’s *Book of Insults – Ancient and Modern for Blaine and other politicians*) the book’s ka-tet [a group of people brought together by fate] are treated to a view of a fantastic landscape as they flee for their lives from a city being poisoned by toxic gas:

“The lands below had been fused and blasted by some terrible event – the disastrous cataclysm which had driven this part of the world deep into itself...The surface of the earth had become distorted black glass, humped upward into spalls and twists...and twisted downward into deep cracks and folds which could not properly be called valleys...Misshapen things which looked like pterodactyls cruised between these pipes on leathery wings...

Whole flocks of these gruesome aviators roosted on the circular tops of other stacks, apparently warming themselves in the updrafts of the eternal fires beneath...Deep inside lay a thin thread of the deepest scarlet, pulsing like a heartbeat. Other, smaller fissures branched out from this...A fiery fountain erupted directly below them, spewing flaming rocks and stringy clots of lava upward. For a moment it seemed they would be engulfed in flames.”

These somewhat over-the-top descriptions come alive because of King’s crisp, clean prose and believable geology and are reenforced by macabre illustrations that are common in many of his books. King’s account of lava flows and volcanic vents conjures up images of Hawaii’s Volcanoes National Park or Llaima in Chile. In this and other passages throughout the book, he enhances the plot and character development by emphasizing the role of geology and using it to augment the story’s setting.

Geology as a Plot Device

Desperation is about how people react to a series of other-worldly events and King ties those reactions inextricably to geology. While some of the drama plays out on the roads and in the town of Desperation, without the open pit, adits and shafts of *Rattlesnake Number One*, there is no setting for the story. Indeed, all of the characters actions lead up to and are focused on the final confrontation that takes place at the mine.

“At the site of the landslide, and not too far from the broad gravel road leading down from

the rim of the pit, there was a black gaping hole. The site of it made David profoundly uneasy. It was as if a monster buried in the desert ground had opened one eye.”

Replace China Pit and *Rattlesnake Number One* with a shopping mall or high rise office building and it loses the mystique and dangers inherent with the natural (and supernatural) processes that the book describes as operating deep within the earth.

Geology serves as a key plot device for the story line in the Dark Tower series. As a young boy and the old-before-his-time title character travel towards their ka [fate] in *The Gunslinger*, geology intervenes:

They had entered a long tunnel of some weird phosphorescent rock, and the wet walls glittered and twinkled with thousands of minute starbursts. The boy called them fot-suls...To the gunslinger the clumps of fot-suls looked like the captive tubes of swamp gas...to the boy they look like endless streamers of neon tubing. But in its glow they could both see the rock that had enclosed them so long ended up ahead in ragged twin peninsulas that pointed toward a gulf of darkness – the chasm over the river.

King is a little loose with phosphorescence in this passage, as calcium carbonate requires either long-wave ultraviolet light or ionizing radiation to fluoresce; neither of which the story mentions. However, the intent of the passage is clear, the geologic setting – a long tunnel through fossiliferous, glowing limestone leads to a deep chasm carved out by a rapidly flowing river. The events that take place

when the two main characters attempt to cross the chasm influence the relationships within the ka-tet in the next six books.

In the final book of the Dark Tower series, *The Dark Tower*, the action centers around a mountain cave overlooking a town that the protagonists must invade. This cave, whether natural or man-made King never specifies, serves as a storage depot for weapons and data. In one scene outside the cave, King has his characters make a fine geologic distinction:

“Roland, limping slightly, led Jake to where the path curled around the flank of the lumpy mountain...He pointed to the ground with his right hand. “What do you see?” ...The ground was littered with pebbles and fallen chunks of rock. Some of the talus had been disturbed, leaving marks in the scree.”

Few writers know the difference between talus and scree and even fewer are able to use that difference to help drive a story-line.

Geology as a Connector to Alternate Realities

Many of King’s works involve the actions his characters take when confronted with or placed in a reality that is outside their normal experience. Whether trapped in a car by a crazed dog (Cujo) or snow-bound in a luxurious mountain resort (*The Shining*), King’s strength as a writer lies in his ability to make those situations, and his characters’ reactions to them, believable and to teach us something about being human. Nevertheless, King faces a dilemma – how do (*continued*)

you transition a story from one world to a different one and, sometimes, back again? In the *The Cell*, he uses an errant satellite signal, in *The Dome* it's an impenetrable, see-through force field. And in *Desperation* and the *Dark Tower* series, it is geology that serves to unite the characters with alternate realities.

In *Desperation*, King explicitly makes the connection between geology and other worlds in this description at the edge of China Pit:

David ignored him: it was still Marinville he seemed to be mostly talking to. "The force of evil from the ini [dimensional portal] filled the can tahs [stone carvings of "little gods" – demonic animal spirits] the same way the miners fill the ground itself – blown into every part of it, like smoke..."

As the main character struggles to close up China Pit and prevent the escape of Tak – the incorporeal evil force that is causing all the trouble – he must move very close to the entryway through a geology that marks its boundary:

"...but the descending, narrowing circle was lined with crystal outcrops of quartz and cracked hornfels. Johnny slid down this like a kid down a slide that has grown crooked glass thorns...Needles of stone tore through them. He saw his shirt-sleeves turn red... He turned over on his side instead, clutching at the crystal outcrops that were tearing him open.

At the bottom of the funnel shaped China Pit, Johnny has the final confrontation with Tak:

"It was no wonder ...that Tak was caught on the other side of the funnel. The hole to which it narrowed was stringent, no

more than an inch across. Red light pulsed in it like a wink.

Deep within the earth, at the bottom of China Pit, is a thin boundary of rock that prevents an evil force desperately trying to leave his world and enter ours. The final actions of the story's surprise main character provide a fitting geologic ending to the book.

Within the *Dark Tower* Series, King uses geology to separate and connect the worlds or, more accurately, the reality in which his characters live. In *The Gunslinger*, as Roland and Jake come closer and closer to their elusive quarry, the Man in Black, geology begins to factor into the story:

Ahead of them the mountain threw up its final defense – a huge slab of insurmountable granite facing that climbed into cloud infinity. At any moment the gunslinger expected a twist in the stream to bring them upon a high waterfall and the insurmountable smoothness of rock – dead end. But the air here had that odd magnifying quality that is common to high places, and it was another day before they reached that great granite face.

But King's most powerful use of geology is when it connects his characters with alternate worlds or even alternate destinies. As Roland plans for the final battle in *Wolves of the Calla*, he accompanies a village elder to a free-standing door in a cave:

The stench breathing from the cave's open mouth grew stronger yet... Something inside the cave, there in the shadows... "Be careful, gunslinger," Henchick said, but stood aside to let Roland enter the cave... "These hills are magnetic, and riddled with

many ways into many worlds. We'd gone into a cave near the old garnet mines and there we found a message."

At the end of *Wolves of the Calla* this cave, and the door in it, sets the stage for the next book. Similarly, although more associated with topography than geology, King creates doorways for his characters to travel to the Maine we know in our world and to interact with him and, I suspect, his neighbors.

Closing Thoughts

On balance, the characters of Stephen King and the stories he creates for them are entertaining, often times insightful, and always, always, unfailingly honest. The same is true of his geology. The descriptions of volcanoes, erosion, and their associated landscapes are credible and serve to support the story line in realistic ways. His description of earth processes and the landforms they fashioned are accurate and work well within the tale he is telling. King's portrayal of our profession can be a useful tool that brings the science to life, albeit not in ways that many of us learned in Historical Geology class. I enjoy his books and look forward to his next release, hopefully one with a good geologic setting.

Acknowledgement:

Many thanks to Bob Stewart for his constructive review of this article.

Bob Blauvelt is a geologist with more than 25 years experience in the investigation and remediation of soil and ground water contamination at commercial and industrial sites. He also has assisted clients in complex,

multi-site due diligence assessments, compliance audits, and provided expert witness services in cost-recovery and liability allocation litigation.

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Early Career Columns from the Soil Science Society of America (SSSA)

SSSA has begun a series of columns on early career development. Written by SSSA members, these columns are meant to help students in the geosciences with career skills such as job hunting, interviewing, creating good presentations, and more! Below are excerpts from a two-part series on interviewing.

Interview Preparation: What Questions Will They Ask Me?

Aaron Patton and Lori Snyder

Preparing for an interview can be a pretty stressful time as there is so much uncertainty in the process. In many academic interviews, you'll meet with at least 20 or more different people during a one- to two-day process with no warning about what they might ask you. As such, you need to think on your feet and be prepared. Without prior preparation, thought, and rehearsal, you will be at a disadvantage.

Some individuals may provide satisfactory answers when put on the spot, while most may need a few moments to think of an answer. This is especially true when asked questions that require reflection. We are not talking

about questions related to your research, but instead questions about your personality, style, philosophy, program, and your vision.

Because we don't routinely talk about these things—at least not as much as young faculty—it is a good idea to develop a list of answers to some reflective type questions that you might be asked in some form or another during your interview. Develop a list of answers to the following common questions:

- » What are your strongest skills?
- » What is your greatest personality strength?
- » What are some of your key accomplishments?
- » What assets do you bring to a team?
- » What are some of the areas you are trying to improve?

Obviously, some of these same questions can be found in a book on interviewing while others are specific to the position. It is a good idea to buy an interviewing book ahead of your interview and quickly read through some of the sample questions and answers to get an idea how best to answer questions. Write down a list of these questions and think about how you would answer them. Practice your responses with another person.

Here is a list of 10 questions that might be helpful. For each question, there is no one right answer, but there are some wrong answers. Questions that may be asked include:

1. What mistakes have you made? Why did you make these mistakes? How did you correct them?
2. If you were to ask a group of friends and acquaintances to describe you, what adjectives

3. Where do you see yourself 5, 10, and 20 years from now?
4. If you could change one thing about your personality just by snapping your fingers, what would it be and why?
5. How would you describe your perfect day?
6. Have you managed people in any of the positions you have held?
7. Do you work well under pressure?
8. If you could start your career over again, what would you do differently?
9. Describe a difficult situation you were in and your response?

You may be wondering what are the right answers. There are many, but let us give you just one example of a good and bad answer. Question 5 is "How would you describe your perfect day?" An interviewer is looking for an indication of how hard of a worker you might be. A good answer might be, "My perfect day would be to get up early and get some work done before others get into the office, to meet with my graduate students and discuss progress on their research and provide them some mentoring, to have lunch with a colleague and discuss potential collaborations, to spend the afternoon writing a manuscript for an experiment that was just completed, and then to spend the evening with my family." This answer discusses your hard work ethic, your interest in developing and mentoring your graduate students, the fact that you are a team player interested in opportunities to collaborate, and that you recognize the importance of publishing your research. It

also tells the employer that you love your family, but that you also are going to be a loyal, hard-working employee.

Keep in mind that it is okay to be yourself and to talk about family and your ability to handle both work life and family life. A bad answer would go something like this, "My perfect day would be to sleep in, go hiking in the afternoon, and go out to my favorite restaurant for dinner." While that sounds like a fun day, it is not the answer they will be looking for. This answer doesn't mention work at all and conveys to an employer that you'd rather be doing something besides working.

Many of the questions you'll be asked will be very specific to the position or discipline and not general like the questions above. Here is a list of some other questions we were asked during our interviews:

- » Can you tell me about your program and yourself?
- » How would you describe how you might interact with county extension agents?
- » How can our department improve its current program in your opinion?
- » How will you get federal funding?
- » Why are you interested in this position?
- » You do a lot of research on (insert topic). Why?
- » What kind of technologies would you use in your program?
- » What is your teaching philosophy (or pedagogy)?
- » If you were to collaborate with other departments, who would they be and why?

If you are a graduate student or post doc, ask your current adviser and department head

if they would conduct a mock interview with you to help you prepare for the interview. This will be very helpful. Talk to other faculty and ask them, “What questions do you typically ask during an interview?” or “What information are you typically looking for from an interviewee?”

Hiring committees and administrators want to know that you can be a team player and a valuable colleague and peer in their department. Thus, in your answers to questions, make sure to interject that you are interested in collaborating with others in the department should you be hired and that your research will benefit (play an integral role with) the team of researchers who are already in the department. Make sure that your answers convey your excitement for the position. Be enthusiastic and most importantly be yourself!

A great resource for early career members searching and applying for careers in academia is “The Academic Job Search Handbook” by J.M. Vick and J.S. Furlong (published in 2008 by University of Pennsylvania Press, Philadelphia).

Interview Preparation: What Questions Should I Ask?

Aaron Patton and Lori Snyder

One of the best things you can do to prepare for your interview is to visit with your adviser, mentor, and department head to see if they have any advice for your interview. In some cases, they might be able to provide some suggestions on what questions you should ask. They also can provide help by contacting

one of their colleagues at the institution where you are interviewing to learn more about the position or to provide a positive reference for you in advance of your interview.

To prepare questions to ask during your interview, you must first gather some data on the people you will be meeting with and, of course, the university, company, or institution that you are interviewing at. Several documents will help you with this. First, ask for a detailed interview itinerary—if one is not provided—including names of individuals you will be meeting with and a list of the individuals on the search committee. The itinerary is a very helpful document in your interview preparation. Second, briefly review the strategic plan for the university, college, and department to learn about their future trajectory and the grand challenges which are identified. Some of these areas may be directly related to the research/teaching/extension program you envision, and this will give you an opportunity to highlight how your program will fit into the larger mission. Third, the department’s most recent USDA-CSREES/NIFA review will be helpful in providing some background information about the department as it will discuss some of its strengths as well as some potential areas where growth is needed. Usually, these documents are found easily on most university, college, and department websites. This data will be especially useful as you develop a list of questions to ask during your interview.

You should develop a detailed set of questions for each person listed on your interview itinerary. For members of the department that you are meeting with,

you should spend some time looking at their faculty pages to get a quick overview of their program as well as their academic background as this may give you some talking points with questions for these individuals during your interview. It is also a good idea to learn about the programs of other faculty in the department that you are not scheduled to meet with although you might do so more briefly. As you study the programs of these individuals, you will be looking for who can be a collaborator with you in the department, who might be a good mentor, who might be using a technique that you could also use in my program, etc.

Following are some questions you may consider asking during your interview:

- » What kind of mentoring programs do you have for new faculty members?
- » How does the department/college reward outstanding faculty? What are some key traits of your best faculty members?
- » Is the scholarship of teaching valued in the department/college/university?
- » What does the promotion and tenure process look like at this university? Are there any guiding documents that describe how the scholarly activities of faculty are evaluated?
- » Do you have any grants available to new faculty? What programs are in place to help new faculty fund graduate students?
- » Will this position advise undergraduates?
- » How many courses will I be expected to teach?
- » What do you consider

to be the strengths and weaknesses of the department/program?

Hiring committees and administrators want to know that you can be a team player and a valuable colleague and peer in their department. Thus, in your questions, you need to make sure to indicate your interest in fulfilling this role by asking questions that indicate an interest collaborating with others in the department and college should you be hired.

Gather information during your interview on faculty who might be receptive to future collaborations and whether or not faculty who have a similar research interest (e.g., soybeans, clay mineralogy, genomics, etc.) as you will be willing collaborators. Ask the chair of the hiring committee if you could meet these potential collaborators if they are not already on your interview itinerary.

Remember, the interview should be as much about answering the question “Do I want to work here” as it should be about trying to get yourself hired. Questions to ask yourself after the interview/job offer include:

- » Is this an environment where I can be productive and successful?
- » Will I receive good mentoring from other faculty here?
- » Is this a place I want to live?
- » Will I be provided the resources I need get off to a successful start?

Earth Science Literacy & the Replacement of the Geoscience Workforce

Michael J. Urban
34 TPG Jul/Aug 2012



As we enjoy a more relaxed summer atmosphere, and the lure of the outdoors once again captures our attention, let's take a moment to reflect on a few issues of interest with implications for our instructional practice next year.

As geoscience educators, we are charged with accomplishing two primary tasks, in a very simplistic sense, through our instruction: 1) prepare students for potential employment in the areas we teach by providing opportunities to learn related content knowledge and skills; and 2) promote an earth science literate citizenry in our nation. We recognize and strive to teach science content and technological skills as they relate to the potential future employment of our students. We understand the importance of promoting science literacy in general, and earth science literacy specifically. We also share with our students what we know about the growing need for a future STEM (science, technology, engineering, mathematics) workforce. Or, do we? For a refresher on some of the statistics and projections related to STEM and geoscience job growth in our nation, read on. This article concludes with the identification of the “big

ideas” in earth science, and the featured resource: Earth Science Literacy Principles. STEM Statistics, Geoscience, and Job Growth

STEM employment in the United States grew by 8% between the turn of the century and 2010, and employment growth is expected to continue. STEM jobs are projected to grow by 17% by 2018, contrasted with about only 10% growth for non-STEM jobs. Despite economic downturn, the Bureau of Labor Statistics projects a nearly 20% growth in ‘science and engineering’ occupations for the period 2008-2018, more

The American Geosciences Institute’s forecast predicts as much as a 35% increase in the needed geoscience workforce by 2018

than the growth expected for any other category of occupations. This is particularly relevant since ‘science and engineering’ includes the ‘physical and life science’ occupations (e.g., petroleum technicians, geoscientists, and environmental scientists) and corresponding college majors (e.g., geology, geoscience, and earth science). Although the ‘physical and life science’ occupations, accounting for about 13% of all STEM occupations, are not projected to grow as much as other categories of ‘science and engineering’ – like health fields, for example – they are expected to experience some growth. The American Geosciences

Institute’s forecast predicts as much as a 35% increase in the needed geoscience workforce by 2018 when both attrition and retirement are taken into consideration.

A few additional facts worth noting:

- » Two-thirds of all STEM workers currently employed hold a college degree.
- » Workers in STEM fields command higher wages, earning more than 25% than their non-STEM counterparts. [For example, those with a bachelor’s degree in STEM earned an hourly average of \$36, whereas those with a non-STEM degree averaged \$28 (in 2011).]
- » STEM workers, in general, have experienced lower unemployment rates than non-STEM workers.
- » About 1500 college graduates are added to the geoscience workforce each year.

These and many others are great reasons for students to pursue STEM-related careers.

Actively Seeking Tomorrow’s Geoscientists

You might now be saying to yourself: “That’s fine, but how does this pertain to me as a geoscience instructor?” The answer relates to our role in recruiting future geoscientists and STEM workers in general. Geoscience educators should consider promoting the previously mentioned STEM and geoscience facts and statistics as a way to market our profession. We could do this through our instruction in applicable courses and encouraging interest in STEM, and perhaps more specifically,

geoscience. It is not easy for undergraduate geoscience degree recipients to find jobs; in many (or perhaps most) cases it

Geoscience instructors should be encouraged to identify, recruit, and inspire students demonstrating either aptitude or interest in geology and related fields.

takes a master’s degree to find a professional job in our field. This really means that we must be encouraging our students to consider graduate programs in the geosciences right out of their undergraduate programs. When we consider the future need for geoscientists, and the typically low student-faculty ratios in most geoscience departments across the country, the prospect of graduate study for interested students should be quite appealing. Geoscience instructors should be encouraged to identify, recruit, and inspire students demonstrating either aptitude or interest in geology and related fields. Many non-science (or non-geoscience) majors elect to take our introductory geoscience courses because they “sound interesting” or are perceived to be “less mathematically rigorous” than other potential science electives, manifesting in prime opportunities for promoting interest in the geosciences. Instructors wield powerful influence, and we can use our sway to help students who are “on the fence” to consider geoscience professions by providing the right encouragement at the right time. A well placed suggestion, recommendation,

We can use our sway to help students who are “on the fence” to consider geoscience professions by providing the right encouragement at the right time.

or idea could be the spark or incentive a student needs to opt for a geoscience major, switch to a geoscience major, or consider graduate study in the geosciences. We should use today to actively seek out tomorrow’s geologists.

Toward an Earth Science Literate Society

In last issue’s Educator’s Page, the petroleum and energy illiteracy of our nation was explored and discussed. It probably comes as no surprise that other aspects of what one might consider “earth science literacy” are equally weak and lacking in our nation’s populace.

What constitutes earth science literacy? A few years

We should use today to actively seek out tomorrow’s geologists

ago, the National Science Foundation funded an Earth Science Literacy Initiative ultimately resulting in several Earth Science Literacy Principles (2009). [Similar endeavors both before and after have resulted in comparable guides for ocean

literacy, climate literacy, and atmospheric literacy.] This guide outlines the nine “big ideas” in earth science as presented in the Earth Science Literacy Principles guide.

Each of the nine “big ideas” includes several supporting principles. Some or all of these principles can be used in our introductory geology, earth science, and related geoscience courses as benchmarks for student learning and overall earth science literacy. A few of the “big ideas” are simple and straightforward (yet not necessarily accepted by our students), such as *the Earth is 4.6 billion years old* (Big Idea 2); others, however, are more intricate and complex, such as *Life evolves on a dynamic Earth and continuously modifies Earth* (Big Idea 6), and *Humans significantly alter the Earth* (Big Idea 9). See the “Featured Resource” section below for the link and additional information.

Featured Resource

The Earth Science Literacy Initiative’s Earth Science Literacy Principles accessible at <http://www.earthscienceliteracy.org>.

The primary resource at this site is the Earth Science Literacy Principles Guide, which on page 2 states that this “guide presents the big ideas of Earth science that all citizens should know, determined by the Earth science research and education communities.” This resource provides a succinct way to share literacy-enhancing ideas with our geoscience students. It could be very useful to point out the relevant “big ideas” or associated principles throughout our class lectures or activities. The principles have also been aligned to the

National Science Education Standards for K-12 educators.

Complementary projects related to ocean, climate, and atmospheric science are also provided at the site. If you’re unfamiliar with the “big ideas” in earth, ocean, climate, and atmospheric science literacy, as defined by these initiatives, these resources are worthy of further investigation. Of particular importance in an integrative science context is climate literacy, which is a continued source of media, political, and environmental attention today.

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The Earth Science Literacy Initiative’s Nine “Big Ideas” of Earth Science

1. *Earth scientists use repeatable observations and testable ideas to understand and explain our planet.*
2. *Earth is 4.6 billion years old.*
3. *Earth is a complex system of interacting rock, water, air, and life.*
4. *Earth is continually changing.*
5. *Earth is the water planet*
6. *Life evolves on a dynamic Earth and continuously modifies Earth.*
7. *Humans depend on Earth for resources*
8. *Natural hazards pose risk to humans.*
9. *Humans significantly alter the Earth.*

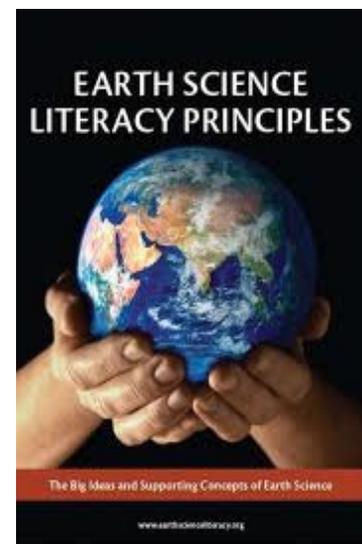


Photo credit: Earth Science Literacy Initiative

New National Ground Water Research and Education Foundation Campaign

The National Ground Water Research and Educational Foundation has launched a major fund-raising campaign to underwrite national and international groundwater projects.

“This is the first major campaign the Foundation has undertaken in nearly 16 years. Our ultimate goal is to raise at least \$3 million over the next 18 months,” said Steve Schneider, MGWC, president of NGWREF. Schneider stressed that 100 percent of funds raised will go to Foundation programs.

A range of programs provide excellent opportunities for those interested in supporting groundwater initiatives that benefit people and the environment, said NGWREF Vice President Art Becker, MGWC, CPG.

The Foundation will continue to seek support for programs such as groundwater research, the Henry Darcy Distinguished Lecture Series in Groundwater Science, and the William A. McEllhiney Distinguished Lecture Series in Water Well Technology. However, NGWREF proposes to fund a number of new programs as well.

“For example, in our Developing Nations projects we will not only continue to help drill water wells for people in need, but we will also offer training and operating

standards to help set up ongoing maintenance projects, too,” said Becker. “This will help increase the sustainability of the water well programs — a serious issue of many water well projects around the world.

“We also want to start a domestic assistance program through our Water Wells for America program, where we can help elderly people and other special populations in rural areas with their water well needs,” he continued.

Following are the campaign funding areas:

- » Workforce Development, \$1.25 million, which includes the lecture series and NGWREF’s two scholarship programs
- » USA Groundwater Fund, \$1 million, which includes the domestic water well assistance program, public education programs focusing on groundwater and water wells, and education and training for groundwater professionals
- » Developing Nations Fund, \$500,000, which includes the international groundwater supply projects, and education and training
- » Groundwater Research Fund, \$150,000, which finances new research considered important to understanding groundwater resources and water well systems
- » 21st Century Fund, which allows donors to make flexible, unrestricted gifts to meet funding opportunities that arise.

“Persons interested in learning more about the NGWREF campaign can obtain a campaign booklet online,” said Kevin McCray, CAE, the National Ground

Water Association’s CEO and NGWREF liaison.

Learn more about NGWREF by clicking here or call 800 551.7379 (614 898.7791).

National Speleological Society (NSS) Educational and Outreach Programs



Caver Safety Training Program:

The NSS Education Division is developing a caver safety training (CST) program as one initiative that will promote responsible cave exploration and fellowship among those interested in caves.

This training program will promote excellence in responsible caving through engaging and interactive courses that expound the knowledge, skills and abilities of people entering cave environments for work or recreation.

CST training program objectives are:

- » Increase cave and karst knowledge
- » Reduce human injury and fatalities
- » Reduce impact to caves
- » Increase caver skills and skill sets
- » Promote cave and karst stewardship

Workshop for Educators:

A workshop for educators is in preliminary planning stages with multiple partners to develop a workshop as a satellite

event to NSS convention. This workshop would serve as an outreach tool for the NSS.

K – 12 Outreach Program:

The National Speleological Society (NSS - www.caves.org) has a robust K-12 outreach program that is manifest in a number of ways. The most well-known is through Project Underground (<http://karsteducation.org/>) which interfaces with the public and K-12 institutions around the country through classroom visits, workshops and field trips.

Several curricula have been developed regarding caves and karst that are aimed at the K-12 age group (<http://www.caves.org/committee/education/lessons.htm>).

The NSS also provides grants for development of cave related curricula in the K-12 age group through the Cave Education Fund (http://www.caves.org/grants/nss_education_home_page.htm).

For more information on any of these initiatives please visit the NSS website at www.caves.org.

AGI National Geoscience Student Exit Survey

In order to provide the geoscience community with better information about the immediate career trajectories of graduating students entering the workforce, AGI has developed a survey tool to ascertain students’ relevant experiences in school, and their career plans upon exiting

school.

A second pilot of this survey tool was distributed to geoscience departments willing to participate. Ultimately, we received 294 full responses from 45 different departments. Full deployment of the AGI Exit Survey will take effect nationwide in spring 2013. With this nationwide distribution, AGI's National Geosciences Student Exit Survey looks to identify three things:

- » The necessary knowledge and skills acquired while in school that aided students in securing employment upon graduation.
- » Students' decision points for entering geosciences fields.
- » Graduating students' preferred jobs, including those positions and careers not considered part of the traditional geosciences workforce.

The Exit Survey will also help establish a benchmark to inform the development of a longitudinal studies of geoscience graduates that looks at their continued career pathways.

Further information about the Exit Survey, including the data from the Spring 2012 deployment and information about how to get involved in Spring 2013, will be presented at the Geological Society of America's Fall Meeting in November 2012, and the American Geophysical Union's Fall Meeting in December 2012. Also, please feel free to contact Carolyn Wilson (cwilson@agiweb.org) if you have any questions or comments about the Exit Survey.



Sheep Mountain, Bighorn Basin, Wyoming. Photo credit: University of Wisconsin <http://www.geology.wisc.edu/maher/air/air07.htm>

Getting Geology Students into the Field



The importance of field schools to practicing geologists is unquestionable; yet, the opportunities to experience field geology are dwindling. The Geological Society of America (GSA), in cooperation with ExxonMobil, is currently offering three programs to support and encourage field geology. This non-profit/industry collaboration has proven very successful, and in 2012 more than 200 geology students and professors applied for these awards.

The GSA/ExxonMobil Big Horn Basin Field Award (deadline 8 April, 2013)

A one week field seminar that offers 20 undergraduate and graduate students and 5 faculty members a chance to receive a high-quality educational experience in the spectacular Bighorn Basin of north-central Wyoming. The course is free to accepted participants, and

all transportation, meals, and living expenses are covered.

The seminar focuses on multi-disciplinary integrated basin analysis and enables awardees to study exposures of individual hydrocarbon system play elements, such as source, seal, reservoir and structure, within a prolific hydrocarbon basin. For more than a century, the Bighorn Basin has been studied by academic, industry and government geoscientists, who have focused on the exceptional outcrop exposures, as well as subsurface borehole and seismic data. Our current understanding of the basin derives from both industry and academic perspectives.

This is not, however, a course on the detailed geology of the Bighorn Basin. Instead, our objectives are to introduce the concepts of integrated basin analysis, including evaluation, prediction, and assessment of play element distribution and quality, using the Bighorn Basin as a natural laboratory. Via this laboratory, we will explore the concepts, methods, and the tools of petroleum geoscience that we use on a day-to-day basis in the energy industry. Our discussions on the outcrop and in the classroom will focus on how we make decisions with limited data and how critical

information is identified in order to evaluate risk vs. uncertainty. We also use the excellent field setting to teach fundamental geoscience skills in structure, stratigraphy, geochemistry, etc. By the end of the school, the teams will generate play element maps, play summary charts, cross-sections, and play fairway maps. The highlight of this course is the presentation of these ideas to the group and the ensuing discussions about how these ideas and play assessments could be further developed.

This seminar is team taught by four ExxonMobil professionals. These geoscientists represent over 100 years of research in integrated basin analysis, with specific skills in tectonics, structure, sequence stratigraphy, sedimentology, paleontology, hydrocarbon systems analysis, and integrated play analysis. GSA's role is to select awardees and to handle all logistics.

The GSA/ExxonMobil Field Camp Scholar Award (deadline 8 April, 2013)

This award provides 17 undergraduate students \$2,000 each to attend the field camp of their choice based on diversity, economic/financial need, and merit. Funds for this award have been provided by ExxonMobil. Selections of awardees are completed by GSA.

The GSA/ExxonMobil Field Camp Excellence Award (deadline 8 April, 2013)

This award provides one geologic field camp an award of \$10,000 to assist with their summer field camp based on safety awareness, diversity, and

technical excellence..

To apply for these awards, please visit <https://rock.geosociety.org/ExxonMobilAward/index.asp>. Students and recent graduates must submit an online application form and record of relevant courses and grades, two letters of recommendation and a cover letter.

Questions? Please contact Jennifer Nocerino, jnocerino@geosociety.org, or +1-303-357-1036.

Celebrate the first-annual Geologic Map Day!

On October 19, as a part of the Earth Science Week 2012 activities, join the American Geosciences Institute (AGI), the Association of American State Geologists (AASG), and the U.S. Geological Survey (USGS) in promoting the importance of geologic mapping to society.

Geologic maps are important for education, science, business, and a variety of other public policy concerns. Geologic Map Day will focus the attention of students, teachers, and the general public on the study, uses, and significance of these tools, by engaging audiences through educational activities, print materials, online resources, and public outreach opportunities.

Be sure to check out the Geologic Map Day poster included in this year's Earth Science Week Toolkit (<http://www.agiweb.org/pubs/pubdetail.html?item=609610>). The poster provides a geologic map of the United States, plus step-by-step instructions for



Geologic map of North America. Photo credit: USGS <http://esp.cr.usgs.gov/info/gmna/>

a related classroom activity. Additional resources for learning about geologic maps can be found on the new Geologic Map Day web page (<http://www.earthsciweek.org/geologicmap/>).

Earth Science Week 2012 will be celebrated October 14-20. To learn more, please visit <http://www.earthsciweek.org/>. To order your Toolkits, please visit <http://www.earthsciweek.org/materials/index.html>. You may also call AGI Publications to place your order at 703-379-2480.

AAPG: Upcoming Educational Events



To view a complete list of all of AAPG's upcoming conferences, workshops and educational events please visit <http://www.aapg.org/meetings/>.

Geoscience Technology Workshops

- » Nov 12-14 Shale Plays: Integrated Technologies - Houston
- » Dec 4-6 Vaca Muerta in Latin America - Buenos Aires
- » Jan 15-16 Deepwater Reservoirs - Houston
- » Feb 26 -27 Solving Water

- Problems - Fort Worth
- » March 18-20 Eagle Ford: New Technologies / Findings - San Antonio

New E-Symposia

- » Oct 4 Micro-seismic Imaging of Hydraulic Fracturing
- » Oct 31 3D Approach to Hydrocarbon Mapping of Resource Plays
- » Nov 8 PropPant Selection Drivers in Unconventional Reservoirs

Full catalogue: <http://education.aapg.org/aapg-esymposia>

- » Sept 17-21 Fall Education Conference - Houston// 5 days, multiple tracks of courses

National Speleological Society Grants

- » NSS Research Grant applications are due NLT January 15th, 2013 (<http://www.caves.org/committee/rac/researchgrants.shtml>)
- » Ralph W. Stone Graduate Research Fellowship applications due NLT March 15th, 2013 (<http://www.caves.org/committee/rac/ralphstone.shtml>)
- » NSS Secondary and Post-Secondary Educator Grant applications due NLT 31 January, 2013 (<http://www.caves.org/grants/SPSEGrant.html>)
- » NSS Education Grant application due NLT 31 March, 2013 (http://www.caves.org/grants/nss_education_home_page.htm)

DOE Starts Long Term Atmosphere Observing Mission

On October 1, the Department of Energy (DOE) launched a mobile laboratory aboard a 852-foot container ship to conduct a yearlong project called the Marine ARM GPCI Investigation of Clouds (MAGIC). DOE's Atmospheric Radiation Measurement (ARM) Climate Research Facility is a scientific user facility designed to provide the climate research community with observatories to improve the understanding and representation of clouds and aerosols in climate and earth system models.

The seafaring lab will travel between Los Angeles, California and Honolulu, Hawaii while measuring the atmosphere from the bottom up and tracking how clouds form and disperse. The equipment aboard the ship will measure black carbon, aerosols, cloud stacks, ozone, light transmission, wind speeds, and temperatures. Overall, the mission hopes to improve the representation of the stratocumulus-to-cumulus transition in climate models. The insights gained from the project could help modelers develop a more accurate projection of future global climate.

These shorts were originally published in the September AGI Geoscience Policy Monthly Review. To read the entire review please click here. To subscribe please email govt@agiweb.org

Presidential Candidates Respond to Major Science Questions

Presidential candidates Barack Obama and Mitt Romney responded to 14 major science questions formulated by the American Geosciences Institute and other top scientific societies. The effort was led by ScienceDebate.org and Scientific American magazine served as the media partner for the endeavor.

In his responses, Obama stated that, "We can work together to create an economy built on American manufacturing, American energy, and skills for American workers." Obama said he would ensure America's position as a world leader in innovation by increasing funding to research agencies and training more science, technology, engineering and math (STEM) teachers. He said his "all-of-the-above" energy strategy coupled with greenhouse gas emission and energy efficiency standards would reduce dependence on foreign oil while addressing climate change. Obama pointed to the awarding of grants to water conservation projects, establishment of the National Ocean Policy and setting the goal of sending humans to an asteroid by 2025 during his Administration as evidence of his support for clean water, ocean health and space exploration. In response to a question on how the candidates would ensure the best available science would be used to inform policy and regulatory decisions, Obama pointed to his transparency initiatives enacted during his first term

and reiterated that scientific data should not be distorted, concealed, or completed without public input. Obama explained that by using natural resources more efficiently and developing alternatives, the U.S. can be less reliant on other countries such as China for rare earth materials.

In a slight reversal from comments made in August, 2011, Romney answered a question about climate change by saying the "world is getting warmer, that human activity contributes to that warming, and that policymakers should therefore consider the risk of negative consequences." However, Romney stated that there is "a lack of scientific consensus" the extent of the human contribution and the severity of the risk. Instead of implementing a carbon tax or a cap and trade scheme, Romney said he would support a "No Regrets" policy that would reduce emissions while benefitting America "regardless of whether the risks of global warming materialize." He cites "robust" government funding on low emissions technology research and development and energy efficiency as steps to lower greenhouse gas emissions while benefitting the American economy. Romney described how by reducing regulations and reforming K-12 education he would promote innovation and stimulate the economy. Romney expressed his support for federal research and stated that the government should ensure "that major breakthroughs are able to make the leap from the laboratory to the marketplace." In regards to water and critical natural resources, Romney discussed how laws protecting air and water are important but need to be reformed so they do not

"delay progress." On the role of science in public policy, Romney explained that he "will ensure that the best available scientific and technical information guides decision-making in my Administration, and avoid the manipulation of science for political gain."

NSF Moves Office of Polar Programs into Directorate for Geosciences

The National Science Foundation (NSF) has realigned four program offices including transferring the Office of Polar Programs (OPP) into the Directorate for Geosciences (GEO).

NSF announced the realignment plan to reduce the number of NSF offices and directorates on September 7 and the plan went into effect October 1. OPP is now a division within GEO instead of its own division within the Office of the Director. Similarly, the Office of International Science and Engineering and the Office of Integrative Activities have merged to become the Office of International and Integrative Activities. The Office of Cyberinfrastructure has become a division within the Directorate for Computer and Information Science and Engineering. These changes have been made "to maximize research and education outcomes for science and engineering, while enhancing NSF's operational agility."

Columbia University Geoscientist Awarded McArthur Genius Grant

Geochemist Terry Plank has been [awarded](#) a \$500,000 McArthur Genius Fellowship for her work in the field of volcanism.

Plank is currently a researcher at Columbia University's Lamont-Doherty Earth Observatory where she and her colleagues are currently studying Guatemala's Volcán Fuego and Hawaii's Kilauea. Her work includes contributions to understanding explosive volcanism and the amount of carbon dioxide and water in magma prior to eruption.

Appropriations Update for September 2012

In September, Congress passed a continuing resolution (CR, [H.J. Res. 117](#)) to fund the government through March 2013, the Office of Management and Budget (OMB) released a [report](#) on the estimated percent reductions for exempt and non-exempt discretionary and mandatory spending, and the American Association for the Advancement of Science's (AAAS) Research and Development Budget and Policy Program released an [analysis](#) of the impacts of sequestration on federal science budgets. The Senate Interior and Environment Appropriations Subcommittee released a

[draft FY 2013 appropriations bill](#) which would increase funding for the United States Geological Survey (USGS) and the Environmental Protection Agency.

Because none of the 12 appropriations bills for fiscal year (FY) 2013 were completed before Congress went on recess in September, the House and Senate were forced to pass the CR to continue funding the government before the end of the fiscal year on September 30. The CR funds federal agencies through March 2013 at a 0.6 percent increase over FY 2012 levels.

As required by the Sequestration Transparency Act of 2012 ([P.L. 112-577](#)), OMB released a report in September which found defense programs would be reduced by 9.4 percent while nondefense programs would be reduced by 8.2 percent if the sequestration were enacted. AAAS analyzed this report and produced a brief estimating the total cuts to federal R&D spending over the next five years if the sequestration were implemented under several scenarios. The brief, titled "Federal R&D and Sequestration in the First Five Years," presents reduction estimates for science agencies under the spending caps agreed to in the Budget Control Act of 2011 ([P.L. 112-25](#)), under the spending caps plus an equal allocation sequestration, and with the spending caps plus a nondefense only sequestration scenario.

On September 25, the Senate Committee on Appropriations Subcommittee on Interior, Environment, and Related Agencies released its FY 2013 draft spending bill. Though Congress has already passed the CR to fund the

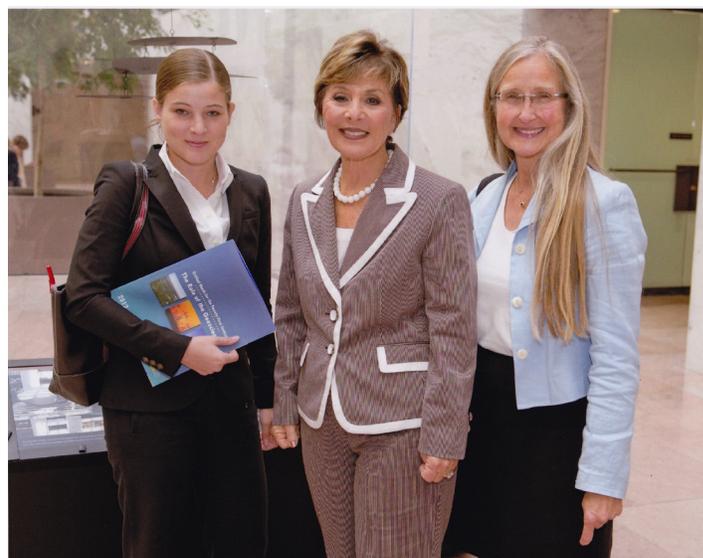
government through March 2013, Subcommittee Chairman Jack Reed (D-RI) and Ranking Member Lisa Murkowski (R-AK) indicated they hope the draft will serve as a roadmap for future spending discussions. An analysis of the draft bill's figures for the USGS and a comparison to the House and President's numbers can be found on the American Geosciences Institute's Geoscience Policy Appropriations [website](#) for the Department of the Interior.

AGI Welcomes 2012 AAPG/AGI Fall Intern

The American Geosciences Institute welcomes Kathryn Kynett from Sacramento, California as its 2012 AAPG/AGI Fall Geoscience and Public Policy Intern.

Kathryn graduated in 2010 with a B.S. in Earth Sciences and a concentration in Environmental Geology from the University of California

Santa Cruz (UCSC). She received honors for her senior thesis which investigated the influence of ocean acidification and anoxia on marine invertebrate ecology during the Permian—Triassic Extinction. Kathryn recently defended her M.S. thesis in Geosciences at San Francisco State University (SFSU). Her M.S. thesis focuses on understanding the Pliocene warm period through utilizing Mg/Ca and O isotope values of planktonic foraminifera to reconstruct thermocline depth in the south Atlantic subtropical gyre over the past four million years. She has been awarded an Achievement Reward for College Scientists (ARCS) Foundation achievement award for her research as well as the James C. Kelley Scholarship and a Pestrong Research Grant. Kathryn has worked at the U.S. Army Corps of Engineers, at the California Academy of Sciences and as a teaching assistant at SFSU. Kathryn's interests include science policy, paleoclimatology, oceanography, water and energy resources as well as geoscience education.



(Left to Right) AGI fall intern Kathryn Kynett, Senator Barbara Boxer (D-Ca), and Professor of Geology at University of California - Davis, Sandra Carlson.

SIPES Installs New Officers and Directors



The Society of Independent Professional Earth Scientists (SIPES) recently installed Dennis M. Gleason, an independent petroleum engineer, and owner of Gleason Engineering in Arlington, Texas as president for 2012-2013. Mr. Gleason holds a B. S. degree in geology from Wichita State University, and an M.S. degree in petroleum engineering from the Missouri School of Mines. He has been an independent consulting reservoir engineer since 1999.

Other 2012-2013 Officers installed at the SIPES 49th Annual Meeting in Bar Harbor, Maine are Vice President William A. Walker, Jr. of Austin, Texas; Vice President of National Energy Eduardo A. Riddle of Corpus Christi, Texas; Secretary Douglas R. Essler of Dallas, Texas; and Treasurer Gilbert D. "Gib" Brown of Amarillo, Texas.

New members of the SIPES Board of Directors include George M. Carlstrom of Denver, Colorado; C. Al Taylor of Reston, Virginia; Terence G. O'Hare of Dallas and James D. Robertson of Fort Worth, Texas.

Continuing directors are James L. Allen of Houston, Donna F. Balin of San Antonio, and Marc D. Maddox and Brian K. Miller of Midland, Texas; James P. Evans III of New Orleans, Louisiana; and Thomas J. Smith of Oklahoma City, Oklahoma.

The Society of Independent Professional Earth Scientists is a national organization of more than 1290 self-employed

geologists, geophysicists and engineers engaged primarily in domestic energy exploration and development. SIPES has eleven chapters located in oil and gas centers of the United States.

Gastaldo Awarded von Humboldt Research Award & Fulbright Fellowship

Robert Gastaldo, Whipple-Coddington Professor of Geology at Colby College, Maine, is a short-term visiting scientist under the auspices of the Alexander von Humboldt Foundation, Bonn, to return to Germany this year during his sabbatical to work with colleagues at the Steinmann Institute Palaeontologie in Bonn. He will continue collaborative work begun when he won a research prize from the foundation prior to his appointment at Colby. At that time he spent a year at the Palaontologische Museum in Gottingen, and he and his German colleagues reconstructed Tertiary-aged, landscape vegetational patterns prior to the global climate decrease that accompanied the current icehouse state.

Gastaldo and Dr. Carole Gee will study the mineralogical and geochemical pathways responsible for preserving fossil wood, commonly known as "petrified wood." They plan field work in the Miocene-aged "petrified forest" of Lesbos, Greece, and the Permian-aged forest of Chemnitz, Germany.

Gastaldo will spend January through August 2013 as a Fulbright Scholar at Rhodes University in Grahamstown, South Africa, in a teaching and research position. He will continue his NSF-funded research in the Karoo Basin investigating the world's greatest mass extinction at the Permian-Triassic boundary. His research team includes Dr. Rose Prevec (Albany Museum, Rhodes University, South Africa), Dr. Johann Neveling (Council for Geoscience, South Africa), Prof. John Geissman (University of Texas-Dallas), Dr. Cindy Looy (University of California-Berkeley), and Dr. Sandra Kamo (University of Toronto). Their focus is on the effects of the Mass Extinction event on the terrestrial landscape, and ecosystem response. Gastaldo was a Fulbright Fellow in the Netherlands in 1982.

Don Steeples chosen as SEG President-elect for 2012-2013

Don Steeples, McGee Distinguished Professor of Geophysics at the University of Kansas, has been elected President-elect of the Society of Exploration Geophysicists for the 2012-2013 term of office. Steeples has long been a leader in the field of near-surface seismic research and is one of only nine people to be awarded both Life Membership (1996) and Honorary Membership (2009) by SEG. He has coauthored 25 papers in Geophysics (of which he was editor from 1989 to 1991) and has served on many

important SEG committees. He was the first president of SEG's Near-Surface Section and received its Frischknecht Award in 1996 and Honorary Life Membership in 2008.

During his long tenure at Kansas, Steeples has mentored many students who have gone on to distinguished careers in applied geophysics. In 2002, the Kansas Geological Survey research group, composed entirely of his former students, received SEG's Distinguished Achievement Award.

Steeples will be the first President-elect under SEG's new Board of Directors governance structure, which will begin at the conclusion of the Society's 82nd Annual International Meeting in November. The 14-member Board will include a seven-member Executive Committee led by David Monk, the current President-elect. Newly elected members of the 2012-13 Executive Committee are Dennis Cooke, Second Vice President, and Gary Servos, Treasurer. Completing the Executive Committee will be Richard Miller, the current Second Vice President who will become First Vice President, Tamas Nemeth, who will be in the final year of his two-year term as Editor, and Bob Hardage, the current President who will take the newly established position of Past



Don Steeples

President. Joining them on the Board will be the winners of the six elections for Directors at Large: Peter Annan, Elsa Jaimes, Alfred Liaw, Samir Abdelmoaty, Edith Miller, and Christine Krohn. The final position on the Board will be the Chair of the Council and it will be filled by a vote of the members of the Council in September.

AAPG 2012 Award Winners

AAPG awards, approved by the Executive Committee, are presented annually to recognize individuals for service to the profession, the science, the Association and the public.

Dietrich Welte, a leader in research and development of the concept and software in 3-D numerical basin and petroleum system modeling has been named the 2013 recipient of the *Sidney Powers Memorial Award* – the highest honor bestowed by the American Association of Petroleum Geologists.

Welte, author of the first comprehensive textbook used in the field of geochemistry, is a retired Professor Emeritus from Technical University RWTH, Aachen, Germany



Dietrich Welte

and adjunct professor from Jacobs University in Bremen, Germany – a university he helped initiate.

Joining Welte at the top of this year's AAPG awardees list is *Stephen A. Sonnenberg*, Boettcher Distinguished Chair of Petroleum Geology at Colorado School of Mines, Golden, Colo., who has been named the winner of this year's *Michel T. Halbouty Outstanding Leadership Award*.



Stephen A. Sonnenberg

Welte and Sonnenberg are among the 55 award winners who have been announced by AAPG and who will be recognized at the opening session of the 2013 AAPG Annual Convention and Exhibition, set May 19-22 in Pittsburgh, Pa.

Welte began his career with Shell International as a research geochemist in 1959. Three years later he returned to his alma mater, University of Würzburg, Germany, where he worked four years. He later returned to the industry as a senior research geochemist for Chevron Oil Field Research (USA) in 1967.

Welte's textbook, "Petroleum Formation and Occurrence," first published in 1978 and expanded in 1984, is still used today in teaching petroleum geochemistry.

He founded the Institute of Petroleum and Organic Geochemistry at the then Kernforschungsanlage, now Forschungszentrum Jülich, in Germany in 1979, and later founded and was director of Integrated Exploration Systems in 1985.

Welte's list of AAPG accolades include recipient of the President's Award (1966), International Special Commendation Award (2000), Special Award (2004) and Distinguished Service Award (2006).

Sonnenberg, who is the seventh recipient of the Halbouty Outstanding Leadership Award, given in recognition of outstanding and exceptional leadership in the petroleum geosciences, received AAPG Honorary membership in 2008.

He has been actively involved in AAPG leadership roles over the last three decades, serving two times on the AAPG Executive Committee as vice president 1995-96, and as president-elect/president from 2002-04, as well as serving on various committees.

To view the other award winners announced by AAPG and who will be honored along with Welte and Sonnenberg in Pittsburgh please visit the AAPG website or click [here](#).

William M. Alley: NGWA Director of Science & Technology

William M. Alley, Ph.D. has been named director of science and technology for the National Ground Water Association.



William M. Alley

Alley recently retired after 18 years as chief of the Office of Groundwater at the U.S. Geological Survey. He will assume his NGWA post November 13, 2012.

"NGWA aspires to be the leading groundwater association advocating for the responsible development, management, and use of water. Bill Alley will help us get there," said NGWA Chief Executive Officer Kevin McCray, CAE.

"I can think of no one better equipped to help NGWA be a 21st century international leader in the dissemination of groundwater-related scientific and technical information. Bill's depth and breadth of experience will be a real asset in NGWA's development of policy to wisely use and protect the planet's groundwater resources."

Alley's NGWA job responsibilities will include:

- » Assuring the scientific and technical accuracy of information disseminated by NGWA
- » Being the scientific liaison between NGWA and government agencies, international organizations, and related nongovernmental organizations
- » Assisting in the development of conferences and other

professional development programs.

During his USGS career, Alley was a hydrologist in the Colorado District's Surface Water Branch, Systems Analysis Group. He also served as the groundwater coordinator in the National Water Quality Assessment Program (1986 to 1990) and coordinator of the Regional Aquifer System Analysis Program (1992 to 1993).

Along-time NGWA member and volunteer, Alley has been a director of the NGWA Scientists and Engineers Division, served on various committees and task groups, and cochaired the 2007 NGWA Ground Water Summit.

His honors include serving as the 2012 David Keith Todd Distinguished Lecturer for the Groundwater Resources Association of California, being named Fellow of the Geological Society of America in 2009, and receiving the E. Benjamin Nelson Government Service Award of the Groundwater Foundation in 2007, the NGWA John Hem Excellence in Science and Engineering Award in 2001, and a Meritorious Presidential Rank Award in 2006.

Alley earned a bachelor's degree in geological engineering from the Colorado School of Mines, a master's degree in hydrogeology from Stanford University, and a doctorate in geography and environmental engineering from Johns Hopkins University.



Charles Fishman. Photo by Lidia Gjordjevka.

Keynote Speaker for NGWA Summit

Charles Fishman has been named the keynote speaker for the 2013 NGWA Summit — The National and International Conference on Groundwater taking place April 28-May 2, 2013 in San Antonio, Texas.

Fishman, an award-winning reporter who has spent the last several years trying to understand water issues around the world, is the New York Times bestselling author of the book, *The Big Thirst: The Secret Life and Turbulent Future of Water*. Focusing on society's relationship with water, his message is cautionary, but optimistic — there is still no reason for a global water crisis as there is more than enough water...it just has to be used smartly.

Since *The Big Thirst* was published, Fishman has spoken about water issues at Wharton School of the University of Pennsylvania, the University of Michigan, the Massachusetts Institute of Technology, and the U.S. State Department. He also recently penned a thought-provoking op-ed article on the current drought encompassing much of the United States.

Click here to submit an abstract for the conference or to learn more about the NGWA Summit.

The *Big Thirst* and other groundwater resources can be found in NGWA's Online Bookstore at www.NGWA.org.

Read an interview with Charles Fishman in *Water Well Journal*® here.

Honored SSA Members

Norm Abrahamson, chief geoscientist at Pacific Gas & Electronic Co. (PG&E), will receive the 2012 *Bruce Bolt Medal*. The Bruce Bolt Medal is jointly awarded by the SSA, COMSOS, and EERI to recognize individuals worldwide whose accomplishments involve the promotion and use of strong-motion earthquake data and whose leadership in the transfer of scientific and engineering knowledge into practice or policy has led to improved seismic safety. Dr. Abrahamson will receive the Bolt Medal in 2012 November at the COSMOS Annual Meeting.

Michel Campillo, SSA Board member and Université Joseph Fourier, Grenoble, France, has been awarded the *European Geophysical Union's 2012 Beno Gutenberg Medal* in recognition of his outstanding contributions to the study of earth structure and seismic sources using novel methods.

James Rice, professor at Harvard University, has been awarded the *European Geophysical Union's Louis Néel Medal* for his contributions to the fundamental understanding of strain localization, poromechanics, and friction, as

well as fault mechanics and the coupling with hydrologic and thermal processes during all phases of the earthquake cycle.

Clay Minerals Society (CMS) Student Awards

The following students were recognized for their outstanding presentations at the CMS Annual Meeting.

First Place. Keith Morrison, Arizona State University. Interaction between antibacterial clays and bacteria: Determining the reactivity and geochemistry of transition elements.

Second Place. Tae-Hee Koo, Yonsei University, Korea. Understanding the illitization step by observing structural and chemical changes in bioreduced nontronite in various redox conditions.

Third Place. Hongi Yuan, Indiana University. Improved automated fitting of X-ray diffraction patterns from interstratified phyllosilicates.



CMS Student travel awardees (L to R): Sandra Londono, Asma Sadia, Keith Morrison, Luke Morgan, Michael Bishop, Baptiste Dazas, Kai Su, Laura Zaunbrecher, Jing Zhang.

CUR Announces Mentor Award Winner



*Tracey
Holloway,
Nelson
Institute for
Environmental Studies at the
University of Wisconsin-Madison,
Recognized as the 2012 Geosciences
Undergraduate Research Mentor*

The Geosciences division of the Council on Undergraduate Research (CUR) annually recognizes an individual with the Undergraduate Research Mentor Award. The awardee is an individual who serves as a role model for productive and transformative student-faculty mentoring relationships and for maintaining a sustained and innovative approach to the enterprise of undergraduate research. CUR is pleased to announce associate professor Tracey Holloway, Nelson Institute for Environmental Studies at the University of Wisconsin-Madison, as the 2012 recipient. The award will be formally presented at the Geological Society of America Meeting in Charlotte, N.C. in November.

Evidence of transformative student-faculty mentoring relationships include: leadership in fostering and sustaining the undergraduate research enterprise, student-mentor collaborations culminating in presentations at national or regional meetings and/or publication with student co-authors in peer-reviewed journals, and innovative approaches to involving undergraduates in research experiences incorporating research activities into the classroom and service learning. The award committee believes

Holloway's program makes her an exemplary undergraduate research mentor.

Holloway's nomination package assembled by former students and current colleagues speaks of unrelenting support and mentoring of both her current research group and former students long after they have moved on. Her colleague, Arlene Fiore of Columbia University, observes how "she is making a major contribution in shaping the lives and careers of these undergraduate students." Her service to the research enterprise as mentor and supporter of these students certainly merit this award and distinction.

Council on Undergraduate Research: The Council on Undergraduate Research (www.cur.org) supports faculty development for high-quality undergraduate student-faculty collaborative research and scholarship. 650 institutions and over 8000 individuals belong to CUR. CUR believes that the best way to capture student interest and create enthusiasm for a discipline is through research in close collaboration with faculty members.

Dr. Albert Ogden presented the 2012 NSS Science Award.

A hydrogeologist with over 35 years of experience since receiving the PhD from West Virginia University. Widely traveled, our awardee has studied extensively in West Virginia, Arkansas, Idaho,

Tennessee, and the Edwards Aquifer in Texas.

As an active consulting hydrogeologist, our awardee has published over 150 professional papers and technical reports on groundwater in karst terrains, and has taught thousands of students.

Currently our awardee is a Professor of Geology and established the Mineral, Gem, and Fossil Museum at Middle Tennessee State University, and is serving as the Museum Curator.

He received the MTSU Foundation Outstanding Public Service Award in 2008. He received an NSS Award in 2002 for his educational video entitled: "Hollow Ground: The Land of Caverns, Sinkholes, & Springs" and the 2011 NSS Tom Zanes Best of Show Award for his educational film entitled "Karst Topography: A Unique and Fragile Environment."

In addition to his professional "Dr. Jekyll" persona, most of us know his "Mr. Hyde" side; he started the Terminal Syphons 29 years ago and has played guitar and sung at the Wednesday Night Convention party 25 times.

SSA Joyner Lecture Memorial Lecture Award for 2013

Kelvin Berryman has been selected as the William B. Joyner Lecturer for 2013. The Seismological Society of America, in cooperation with the Earthquake Engineering Institute, sponsors this prestigious award. Dr. Berryman will speak at both



SSA and EERI 2013 Annual Meetings on the topic of the characteristics and broad implications of the Canterbury earthquake sequence. More information will soon be available in the awards section of the SSA website.

Please visit http://www.seismosoc.org/awards/joyner/joyner_lectures.php to learn more.

In Memoriam

Seismological Research Letters

John (Jack) H. Healy, a visionary geophysicist passed on 6 March 2012 in the company of his family. Jack spent his career at the U.S. Geological Survey and his scientific legacy survives him at the USGS Earthquake Science Center in Menlo Park, California, where research projects he founded continued to flourish. He will not be forgotten and his scientific inspirations live on in the young scientists whom he nurtured during his long, productive career.

(The full obituary is available in SRL 83:5.)



Congratulations! 2012 AIPG Student Scholarship Winners!



The AIPG Executive Committee is pleased to announce the awardees for the 2012 Student Scholarships. AIPG has awarded six scholarships this year. The following are excerpts from their essays. To read the responses in their entirety please click [here](#).

The scholarships are made possible by the support of the Foundation of the American Institute of Professional Geologist and the AIPG members voluntary contributions.

Alexandra Breeding, SA-1749

Geology was not a study I had thought of pursuing before I went to college. I considered chemistry and engineering and art and computer science and law, but not geology. Rocks were fascinating, but I do not recall being conscious of them as the focus of study. Therefore, I took chemistry classes and planned my mechanical engineering degree while I doodled in notebooks and taught myself computer programming. Then, by chance of an invitation from a professor, I took an earth science class. I have not looked back since then. Something about the subject knocked me silly. Maybe it was the way a natural laboratory could create structurally unparalleled compounds with the most beautiful shapes and colors; maybe it was that I could see how groundwater moves through complex sedimentary facies by modeling the geology with a computer; maybe it was because I wanted something to take all the pieces of what I was learning and ask for more. Playing with rocks, I finally got to use everything I knew to make sense of a problem. I have

never enjoyed learning about something more than I have learning about the earth.

To read more click [here](#).

Na Hyung Choi, SA-3141: Sauntering through a trail with heavy foliage is one of my favorite pastimes -- a surprise scenery sometimes awaits behind the leaves. Last summer, I emerged from such a trail onto the edge of a vast and sinuous gneiss outcrop. On the opposite edge, the Chattooga River gushed over the hill of naked metamorphic rock. Here at Woodall Shoals, South Carolina, I scurried from one spot to another with a notebook and a camera, searching for clues to deformation phases. This first field project of mine gave me the challenge and satisfaction of addressing a question about the very mountains I live on. Similarly, addressing questions about the very planet we live on is not only intellectually stimulating but also critical to the status of our communities. As a geologist, I want to help foster public discussion about controversial issues, explore our physical world, and eventually teach and inspire young minds.

To read more click [here](#).

Rania Eldam, SA-3215

Three years ago, I knew nothing about the geosciences. I was a dramatic writing major who had just transferred to the University of Texas at Austin from New York University to pursue a film degree at a university a bit closer to home. I was forced to take a natural science credit by my department, thought that the "Age of Dinosaurs" class looked easy and fun, and so I enrolled

in the class. Once I began to learn a bit about the obscure science, I was addicted. Four weeks into class and I was chatting with Dr. Timothy Rowe about possible ways to get involved with research. They never saw me as a joke, this girl that had been writing screenplays and plays for two years; they saw me as potential. I began working with dinosaur fossils and learning computer modeling programs to work with CT data of avian skulls. I applied for a transfer into the Jackson School of Geosciences, and was accepted in the Fall of 2010, on the Deans' Honors List with an academic scholarship. To read more click [here](#).

Brooklyn Hildebrandt, SA-3395

In the second grade, I received my first ever parent-teacher conference. Although I wasn't sure what it was for, I knew it wasn't good. After the conference, I was switched into another class and when I asked my mom why, she told me I had asked Mrs. So and So too many questions.

"Too many questions?" I remember saying as I was flabbergasted by my mom's statement. I didn't understand how I was supposed to learn without them.

"Some teachers just don't take well to students like you, Brooklyn. You'll love your new teacher though, she's very sweet," my mom left the issue by the wayside like it was another week's garbage.

I think it was then that I learned the importance of questions. Of questioning the answers given to me, questioning the world around me, and even questioning myself. Eventually, I learned the question-welcoming subject

was science. Science was the first class that taught me how to question and what my questions could lead to with proper efforts. A scientist, to me growing up, was the Queen of Questions, and I knew I wanted to be her one day.

To read more click [here](#).

Jennifer Kasbohm, SA-3457

Growing up, I wanted to be a spy. Not the James Bond kind of spy, the idol of teenage boys everywhere. My fascination with espionage came in fifth grade, with the release of a new television show called "Alias." In this series, Jennifer Garner played Sydney Bristow, a double agent for the CIA who fights to bring down an evil terrorist organization. Despite the dangers of her job and the adversity she faced, Sydney was everything I wanted to be. She was smart and poised, athletic and determined, cool under pressure, and above all, resourceful. Schooled in weapons and martial arts and the master of many languages and disguises, Sydney could handle any situation with confidence. Her missions took her to exotic locations all over the world, from Rome to Siberia to Indonesia to Egypt. With a chameleon's skill, Sydney played any role, for one slip could mean certain death. Her ability to handle these dangers in spite of being female made her far more interesting to me than James Bond.

To read more click [here](#).

Don Osborne, SA-3137

Ever since I was a child I was fascinated by the Earth. I wanted to learn more about the world around me, and grew up in Northern Florida along what I now know to be

the coastal plain. Attending a small rural community school system gave me some insights into earth sciences, at least as much as a meager public school system budget would allow. I, out of all the toys I had received in my preteen years the one I remember the most was a small mineral sample box that my grandparents bought me on a trip to a flea market one weekend. The sample box contained hand samples of pyrite, galena, halite, and calcite. As a child I was fascinated by the samples and they were akin to treasures to a young boy in a farming community.

To read more click [here](#).

Kristina Pourtabib, SA-3410

Ever since I can remember, I have been fascinated with the Earth. Even today I have fond memories of my family's annual vacations to various National and State Parks all across the continental United States. I can still picture my younger self standing in awe every time we came to a vantage point on our hikes and not yet being able to wrap my then elementary school educated mind around how these spectacular landscapes came into existence. As a young kid I was an avid rock collector from all of our trips, and over the years I have amassed, what I think to be, quite an impressive rock collection. To this day, that same rock collection which currently resides in my basement, neatly organized into various tackle boxes, has me impressed with my younger self at the unique samples I was fortunate enough to have obtained. From those early signs, one would think that my love for the outdoors and for the Earth would have led me directly down the career path to becoming a geologist,

but it actually took quite some time for me to figure that out for myself. Unfortunately, throughout my early years of schooling, geology was always portrayed as more of a hobby than a viable career option, and it was because of this early learned mentality towards geology that it took me so long to change my perspective and consider geology as a real educational option.

To read more click [here](#).

Jenna Schmidt, SA-3049

I do not have any elaborate reason to explain why I want to become a geologist. I guess you could say that it just seems to fit who I am. I have always found science in general to be a fascinating subject. I think it is amazing how mankind can have so much knowledge built up over so many years. It astonishes me how we can know so much about the planet we live on.

My journey into the world of geosciences began my senior year of high school when I decided to take an environmental science class. I originally took the class for the AP credit, but little did I know it was a decision that would affect my entire future. I ended up loving the class.

I learned about so many current issues going on in the world and affecting our planet. I felt as if I had been blind to so many important issues for so long. I asked myself, "Why don't more people know about these things?" It was then that I felt the urge to pass this knowledge onto others.

To read more click [here](#).

Congratulations AIPG 2012 National Award Winners!



The AIPG 2012 National Awards were presented at the AIPG Annual Meeting in Rapid City, South Dakota on September 24, 2012. The four award recipients are Richard "Rick" H. Powers, AIPG Ben H. Parker Memorial Medal; Mark W. Rogers, AIPG Martin Van Couvering Memorial Award; James "Jim" R. Burnell, AIPG John T. Galey, Sr. Memorial Public Service Award; and John L. Bognar, AIPG Honorary Membership.

Richard "Rick" H. Powers to receive the 2012 AIPG Ben H. Parker Memorial Medal

This year Rick is the recipient of the Institute's highest award, the [Ben H. Parker Memorial Award](#) in recognition of his long standing service and contributions to the Institute, the profession of geology and promotion of geoscience careers.

Rick received his A.B. in geology from Boston University in 1974. In 1981 Rick and wife Nikki moved to central Florida where he joined a small consulting company primarily working in the phosphate mining and processing industry. Rick began working at Bromwell Engineering as the only geologist and in the mid-1980's became an officer in the company and focused his attention on expanding the companies consulting services. In 2011 Rick and the stockholders of BCI sold the company to amec Environment & Infrastructure, a 27,000 person international consulting company.

Today Rick is semi-retired and continues to work with amec as an on-call employee

with the title Principal Geologist.

Rick is a registered professional geologist in Florida and has been an AIPG Certified Professional Geologist since 1985. He is a member of AIPG (+ 25 years), Society of Mining, Metallurgy & Exploration (+25 years), Geological Society of America, Association of Environmental & Engineering Geologists, American Water Resources Association, Western Dredging Association and North American Lakes Management Society (corporate). Over almost three decades he has served AIPG as a national screening board member, advisory board member, Intersociety Liaison Committee - Chair, American Geosciences Institute (AGI) Environmental Committee Representative, Subcommittee on Competition between Government and Private Sector, President-Elect, President and Past President and currently serves as a Trustee of the AIPG Foundation, among other things. Rick has also served the American Geosciences Institute as a Member at Large of the AGI Executive Committee and as AGI's President-Elect, President and Past President. Currently Rick serves as AGI's Foundation Chairman.

Mark W. Rogers to receive the 2012 AIPG Martin Van Couvering Memorial Award

Mark went to the University of Idaho in Moscow from 1979 - 1983.

In 1993, Mark obtained his CPG with AIPG and his PG with the State of Alaska. Mark supported various committees for the AIPG Alaska Section

leading up to the Girdwood Annual Meeting in 1999, where he was the technical programs chair and later 2001 President-Elect.

Today, Mark works for Kleinfelder in Irvine and San Diego, CA as a Senior Project Manager supporting Navy and U.S. Army Corps of Engineers environmental/geotechnical/munitions response contracts in the Western US and Guam, and is active in the AIPG California Section.

To learn more about the Martin Van Couvering Memorial Award please click [here](#).

James "Jim" R. Burnell to receive the 2012 AIPG John T. Galey, Sr., Memorial Public Service Award

This award recognizes Dr. Burnell's efforts to publicize the importance of the mining industry and the US's needs for mineral commodities.

Jim has worked in various aspects of geology for over forty years, including: minerals exploration in the Southern Appalachians and the Great Lakes Region, research in the mobility of various radionuclides in the natural environment, and investigations on contaminated sites in six states from Maine to California.

He has delivered 70 talks to various groups in Colorado and the U.S. on the topic of the US's mineral dependence. His presentations carefully point out the uses for these minerals in areas from aerospace to industry to electronics. Most relevant to many audiences is the recognition that our modern electronic devices and alternative energy technologies depend on the products of the mining industry brought from

abroad.

Jim has shared this knowledge to groups ranging in scope from civic clubs to alternative energy advocacy groups to politicians at the state and national level. Included have been webinars for the AGI/AIPG and the Western Business Roundtable, courses for continuing legal education (CLE), continuing education for teachers, the Energy and Minerals Field Institute (EMFI) for legislative and executive staffers from Washington D.C., courses for the Bureau of Land Management, county commissioners and staff and university lectures. Informing the public on the need for natural resources for our country to thrive and even survive has brought Jim back to where he started - education.

To learn more about this award please click [here](#).

John L. Bognar to receive the 2012 AIPG Honorary Membership Award

After receiving his degree from Missouri State University 33 years ago, John began his career as a petroleum exploration geologist. From there he changed pace a bit to a multi-million dollar groundwater clean-up project in the environmental arena. John then ran a profit center for the most senior groundwater geology consulting firm in the nation. Most recently, he is directing a geologic services group for a 200 person consulting firm.

John's experience includes working on and directing executive boards, interrelating with CEOs and technical staff, corporate officers of large and small companies, executive directors of professional societies, attorneys, heads of federal and state regulatory

agencies, two state governors, and state and federal legislators

John served AIPG as the Missouri Section President and participated in several section level committees. Later, he contributed time and energy to the AIPG National Executive Committee for 7 years as the Secretary, the Treasurer, President Elect, President in 2009 and Past President, as well as a few ad hoc and other AIPG committees on which he still serves.

To learn more about this award please click [here](#).

National Ground Water Association announces annual awards

The National Ground Water Association has announced its annual Awards of Excellence, Outstanding Groundwater Project Awards, and Divisional Awards, which will be presented this December during the NGWA Groundwater Expo and Annual Meeting in Las Vegas, Nevada.

The awards will be presented in December at NGWA's Groundwater Expo and Annual Meeting in Las Vegas, Nevada.

NGWA's top honor, the *Ross L. Oliver Award*, has been awarded to *Tom Downey*, CWD/PI, 2006 NGWA president. Downey is president and chief executive officer of Downey Drilling Inc. in Lexington, Nebraska. Read more about this and the other awards by going to the NGWA newsroom.

The M. King Hubbert Award for major science contributions to the knowledge of groundwater: Professor *Brian Berkowitz* of the Weizmann Institute of Science

in Rehovot, Israel.

Robert Storm Interdivisional Cooperation Award: John W. "Jack" Henrich, MGWC, CVCLD, and NGWA's 2011 president.

Life members: William M. Alley, retired chief of the U.S. Geological Survey's (USGS) Office of Groundwater; Texas Ground Water Association Executive Secretary *Leroy Goodson*; *Beverly L. Herzog*, CGWP, retired from the Illinois Geological Survey; *Randy Lyne*, president and owner of Fort Worth-based Preferred Pump & Equipment; *Dr. Thomas E. Reilly*, retired from the U.S. Geological Survey; *Dr. Jose Joel Carrillo Rivera* of Mexico University.

Honorary Member: Jane Wittke, senior planner for the Ohio-Kentucky-Indiana Regional Council of Governments.

Technology Award: Ray Roussy, president of Sonic Drill Corporation and Sonic Drilling Limited, British Columbia, Canada.

Safety Advocate Award: Jim Wright of National Exploration, Wells & Pumps in Shawnee, Kansas.

Special Recognition Award: Hydrogeologist Stephen Baker of Nevada City, California, for his work in promoting groundwater stewardship, and the Water Replenishment District of Southern California for its Water Independence Now water efficiency and conservation program.

Manufacturers Award: George Simas, president and chief executive officer of Randolph, Massachusetts-based Flexcon Industries.

Supplier of the Year Award: Preferred Pump & Equipment



salesman *Greg Esborg* of Tacoma, Washington.

Standard Bearer Award: *Scott Fowler*, CWD/PI, and president and co-owner of *Dahlman Pump & Drilling Inc.* in Burlington, Washington.

Keith E. Anderson Award: *John R. Jansen, Ph.D.*, P.G., of *Cardno ENTRIX* in West Bend, Wisconsin.

John Hem Excellence in

Soil Science Society of America (SSSA) Announces 2012 Award Recipients



Awards will be presented at the Annual Meetings in Cincinnati in October.

The Soil Science Society of America (SSSA) announces the following 2012 awards that will be formally presented during their Annual Meetings, Oct. 21-24, 2012 in Cincinnati, OH.

Susan Brantley, Earth and Environmental Systems Institute at Penn State - SSSA Presidential Award: Susan Brantley is Distinguished Professor of Geosciences in the Department of Geosciences at Pennsylvania State University. She received her B.A., M.A., and Ph.D. degrees in Geological and Geophysical Sciences from Princeton University.

Daniel Hillel, Columbia University - SSSA Presidential Award: Daniel Hillel is a Senior Research Scientist at the Center for Climate Systems Research, part of the Earth Institute of Columbia University, and is working on the adaptation of

Science and Engineering Award: U.S. Geological Survey hydrogeologist *Dr. Paul Hsieh.*

Outstanding Groundwater Protection Project Award: *Mesa Water District (MWD)* in Costa Mesa, California.

Outstanding Groundwater Remediation Project Award: Engineering and consulting firm *ARCADIS.*

agriculture to climate change in association with NASA/Goddard Institute for Space Studies. *Hillel* is the recipient of the 2012 World Food Prize for his work in conceiving and promoting micro-irrigation methods that have helped increase crop production on arid lands in numerous countries.

Pedro A. Sanchez, Columbia University - SSSA Presidential Award: Pedro Sanchez is the Director of the Tropical Agriculture and the Rural Environment Program and Senior Research Scholar of the Earth Institute at Columbia University. He also directs AfSIS, the African Soils Project, developing the digital soils map of the world and related information systems.

Jan Vanderborght, Forschungszentrum GmbH - Don and Betty Kirkham Soil Physics Award: Jan Vanderborght is a senior scientist at the Agropshere Institute of the Forschungszentrum Jülich. He is associate professor at the Department of Earth and Environmental Sciences at the KU Leuven where he also received his Ph.D. and M.S. degrees.

Dylan E. Beaudette, University of California-Davis - Emil Truog Soil Science Award: Dylan Beaudette is a Soil Scientist with the USDA-NRCS, working in the Sierra Nevada Foothill and Mountain region of California. He received B.S., M.S., and Ph.D. degrees from the University of California Davis.

Ravendra Naidu, CRC CARE Contamination Assessment and Remediation of the Environment - International Soil Science Award: Ravi Naidu is Professor of Environmental Remediation and the Managing Director of CRC CARE and also the inaugural Director of the Centre for Environmental Risk Assessment and Remediation at the University of South Australia.

Kerry Arroues, USDA-NRCS - Irrrometer Professional Certification Service Award: Kerry Arroues is a MLRA Soil Survey Leader with the USDA-Natural Resources Conservation Service. He is in charge of updating soil surveys in California covering the San Joaquin Valley and Delta. He received a B.S. degree from CSU, Chico in 1973.

Graeme L. Hammer, University of Queensland - L.R. Ahuja Ag Systems Modeling Award: Graeme Hammer is Professor in Crop Science and Director, Centre for Plant Science of the Queensland Alliance for Agriculture and Food Innovation at The University of Queensland in Brisbane, Australia. He completed BS and M.S. degrees at University of Melbourne, BA at University of Queensland, and Ph.D. at Kansas State University.

Johannes Lehmann, Cornell University - Marion L. and Chrystie M. Jackson Soil Science Award: Johannes Lehmann is an Associate Professor of Soil Biogeochemistry and Soil Fertility in the Department

of Crop and Soil Sciences at Cornell University. He received his undergraduate and Ph.D. degrees from the University of Bayreuth in Germany.

Rajiv Khosla, Colorado State University - Soil Science Applied Research Award: Raj Khosla is a Professor of Precision Agriculture at Colorado State University. Currently, he is appointed as "Jefferson Science Fellow" to the Office of Science and Technology Advisor, U.S. Department of State in Washington D.C. He earned his M.S. and Ph.D. degrees from Virginia Tech.

Domy Adriano, University of Georgia - Soil Science Distinguished Service Award: Domy Adriano is Professor Emeritus of Environmental Soil Chemistry and biogeochemist at the University of Georgia Savannah River Ecology Laboratory. He has published more than 180 journal and proceedings articles and book chapters and edited or co-edited 12 books.

Gary "Pete" Peterson, Colorado State University - Soil Science Distinguished Service Award: Gary "Pete" Peterson is Professor Emeritus and former Head of the Soil and Crop Sciences Dept. at Colorado State Univ. He was privileged to serve as SSSA President in 2008. He received degrees from the Univ. of Nebraska and from Iowa State Univ.

Eric C. Brevik, Dickinson State University - Soil Science Education Award: Eric C. Brevik is a Professor of Geology and Soils in the Depts. of Natural Sciences and Agriculture & Technical Studies at Dickinson St. Univ. He received B.S. and M.A. degrees from the Univ. of North Dakota and the Ph.D. degree from Iowa St. Univ.

Clifford S. Snyder, International Plant Nutrition Institute Americas Group - Soil Science Industry and

Professional Leadership Award: Clifford Snyder is a soil scientist and the Nitrogen Program Director for the International Plant Nutrition Institute. He received B.S. and M.S. degrees from the University of Arkansas, and a Ph.D. degree from North Carolina State University.

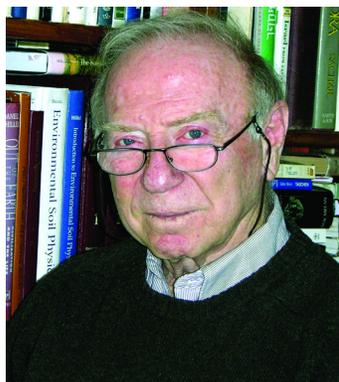
Magdi Selim, Louisiana State University - Soil Science Research Award: Magdi Selim is Endowed Professor of Soil Physics in the School of Plant, Environmental and Soils Sciences at Louisiana State University. He received B.S. degree from Alexandria University and M.S. and Ph.D. degrees from Iowa State University.

Jason G. Warren, Oklahoma State University - SSSA Early Career Professional Award: Jason Warren is an Associate Professor and Extension Specialist in the Department of Plant and Soil Sciences at Oklahoma State University. He received B.S. and M.S. degrees from Oklahoma State University, and Ph.D. degree from Virginia Tech.

For more information on the 2012 SSSA awards, visit: www.soils.org/awards/award. For more information on the 2012 Annual Meetings, visit: www.acsmeetings.org.

Longtime SSSA Member Wins 2012 World Food Prize

An Israeli-American scientist and 52 year member of the Soil Science Society of America and American Society of Agronomy is named the 2012 World Food Prize Laureate. The selection of *Dr. Daniel Hillel* was



Dr. Daniel Hillel

announced on Tuesday, June 12, 2012 in Washington, D.C., at a ceremony where Secretary of State Hillary Rodham Clinton delivered the keynote address and shared in naming Dr. Hillel the recipient.

Following his selection, Dr. Hillel released this statement from Zikhron Ya'akov, Israel: "My joy and gratitude at being granted the World Food Prize this year is tempered by the realization that the work this award recognizes is far from complete. The task of improving the sustainable management of the Earth's finite and vulnerable soil, water, and energy resources for the benefit of humanity while sustaining the natural biotic community and its overall environmental integrity is an ongoing and increasingly urgent challenge for our generation and for future generations. Meeting this challenge will require enhanced global cooperation and integrated scientific research. It is a task, indeed a collective responsibility, that we cannot shirk and must indeed broaden and intensify."

A Pioneer in Efficient Water Use

Born in the United States but raised in Israel, Dr. Hillel was first drawn to the issue of agriculture and water scarcity during his days living in the the

Negev Desert. His research led to a shift from the prevailing method of irrigation where farmers typically applied large amounts of water in episodes of flooding to saturate their fields, followed by longer periods of manufactured drought to dry out the soil. The new method of a micro-irrigation system, developed by Dr. Hillel as seen in the photo from 1971, applied water in small but continuous amounts directly to plant roots, cutting the amount of water needed to nourish and maintain crop health, resulting in higher yields to feed more people.

Dr. Hillel's water management concepts have spread around the world--integrating scientific principles, practical applications and outreach to farmers, communities, researchers, and agricultural policymakers in more than 30 countries,

Learn more about Dr. Hillel, [here](http://www.soils.org/files/about-soils/soil-carbon-climate-change-csa-news-09-issue-06.pdf). And read one example of Dr. Hillel's continuing research, as published in CSA News, here: <https://www.soils.org/files/about-soils/soil-carbon-climate-change-csa-news-09-issue-06.pdf>

The World Food Prize: A Symbol of Achievement

The World Food Prize was created in 1987 by Nobel Peace Prize winner Dr. Norman Borlaug, and is considered the foremost international award recognizing individuals who have contributed landmark achievements in increasing the quality, quantity or availability of food in the world. The prize was endowed by John Ruan Sr. to continue his legacy. Iowa businessman John Ruan III now serves as chairman of the organization. A Selection Committee of experts from

around the world oversees the nomination and selection process, and is chaired by Prof. M.S. Swaminathan, who was also the first World Food Prize Laureate.

View Secretary of State Hillary Rodham Clinton's comments about the award and the 2012 winner, [here](#).

Dr. Hillel will formally receive the \$250,000 World Food Prize award at the 26th Annual Laureate Ceremony at the Iowa State Capitol on October 18, 2012. It will be in conjunction with the Borlaug Dialogue International Symposium in Des Moines, Iowa.



Japan 1971: Hillel introduces drip irrigation and tensiometry in Japan.

SSSA 2012 Class Fellows

The Soil Science Society of America (SSSA) announced their 2012 Fellows that will be formally recognized during their Annual Meetings, Oct. 21-24, 2012 in Cincinnati, OH. Members of the Society nominate worthy colleagues based on their professional achievements and meritorious service. Only 0.3 percent of the Society's active and emeritus members may be elected Fellow. To view the SSSA 2012 Class Fellows please visit <https://www.soils.org/news-media/releases/2012/0829/560/>

October 2012 Meetings of Agronomy, Crop, and Soil Science Societies

More than 3,000 research talks and posters to be given at Societies' annual meetings this year

How are manufactured nanoparticles affecting the world's terrestrial and aquatic ecosystems? What are the linkages between organic farming, healthy soils, and healthy foods? Can "grey" wastewater be safely used to irrigate farmland and replenish groundwater supplies? What strategies are underway around the world to sustain food security in the face of climate change?

These are just a few of the questions that will be discussed at International Annual Meetings of the American Society of Agronomy (ASA), Crop Science Society of America (CSSA), and Soil Science Society of America (SSSA). The meetings will be held in Cincinnati, Ohio on Oct. 21-24, 2012.

More than 3,000 research presentations will be given at the meetings, and more than 4,000 scientists, ag professionals, educators, and students from around the globe are expected to attend. Below are highlighted just a few of the symposia and talks; the full scientific program can be viewed here: <http://scisoc.confex.com/scisoc/2012am/webprogram/start.html>

Journalists, freelance writers, and public information officers are also invited to attend, and can receive complimentary

registration and use of the press room. To learn about eligibility, go to: <https://www.acsmeetings.org/newsroom>. For more information and to receive press credentials for the meetings, contact Madeline Fisher, mfisher@sciencesocieties.org, 608-268-3973.

To view a complete list of the meetings highlights please click here: <https://www.soils.org/news-media/releases/2012/0820/552/>.

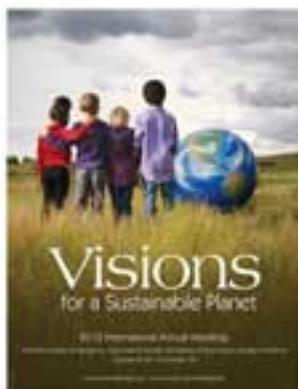
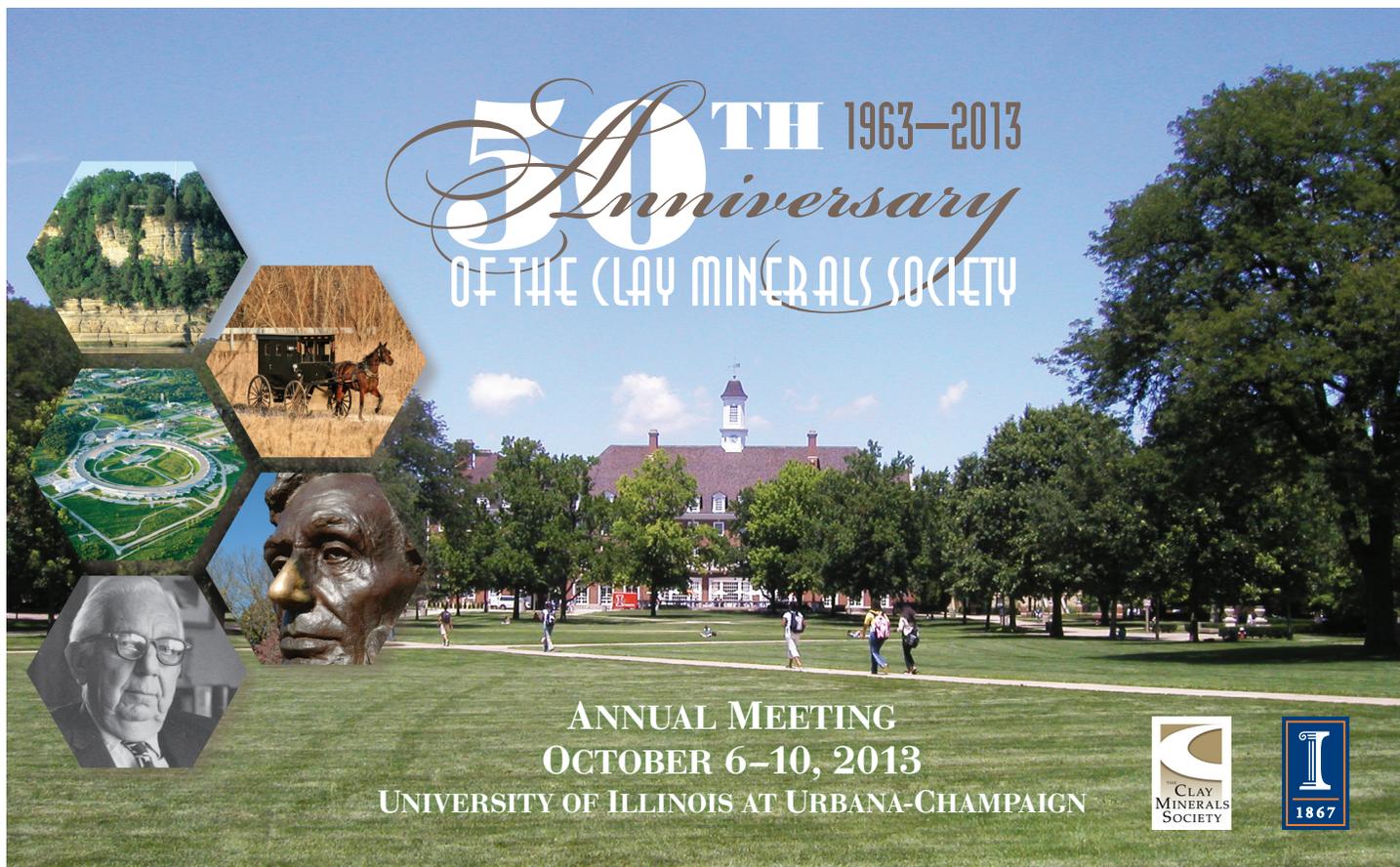


Photo credit: Erin Camp, AGI



Association for Earth Science Editors 2012 Annual Meeting

San Diego, CA • October 8-12, 2012



Save the Date for the AESE annual meeting which will be held in Dan Diego from October 8-12, 2012. We will return to the Hacienda Hotel in Old Town. The field trip will include the Roadside Geology of Sunrise Highway in the Laguna Mountains and a visit to the Anza-Borrego Desert where will tour the Galleto Meadows "Sky Art" installation. More details to follow soon, please visit <http://www.aese.org/shell.html>.

NGWA Focus Conference on Gulf Coast Groundwater Issues

Baton Rouge, LA • October 16-17, 2012

The U.S. Gulf Coast has experienced more than its typical share of disasters in the past decade. Extreme weather events and

manmade disasters have challenged the area regarding prudent water and groundwater management — too much, not enough where needed, or water quality challenges. Coastal and inland communities, as well as thriving urban centers, face continuing and variable challenges on how best to cope with large-scale catastrophes that threaten water resources from both the quality and quantity perspectives. Broken levees and storm surges can impart saltwater contamination or intrusion into local coastal groundwater supplies. Overpumping of groundwater for both water supplies and construction dewatering can induce subsidence in already-threatened lowland areas. Safe solid waste disposal for storm debris and construction waste is a challenge as multiple natural disasters stress landfills that were already near capacity. What technologies, new tools, and technological advancements can be applied to meet these challenges? And, as a result, what opportunities are being created for groundwater professionals in the Gulf Coast region?

Conference program

Abstracts for this conference were due April 23, 2012 and are currently under review. Once chosen, a link to the online conference program will be posted here.

Topics under consideration include:

- » Petroleum release products and remediation
- » Commercial solid waste management following extreme weather events

- » Impact of climatic events on groundwater
- » Geospatial technologies, LIDAR, and subsidence
- » Leaking water and wastewater pipes and their impacts on groundwater
- » Alternative water supplies including desalination and ASR
- » Impacts of aquaculture.

<http://www.ngwa.org/gulfcoast>



Modeling Structural Evolution to Improve 3D Models for Exploration and Mine Development

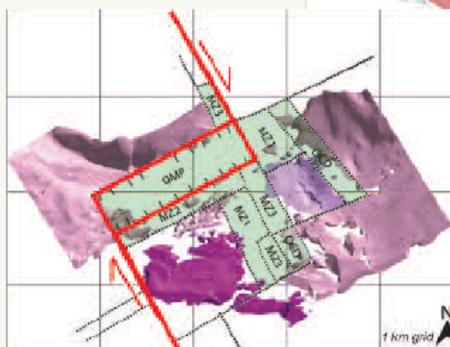


October 25–26, 2012 • SEG Headquarters Course Center, Littleton, Colorado, USA

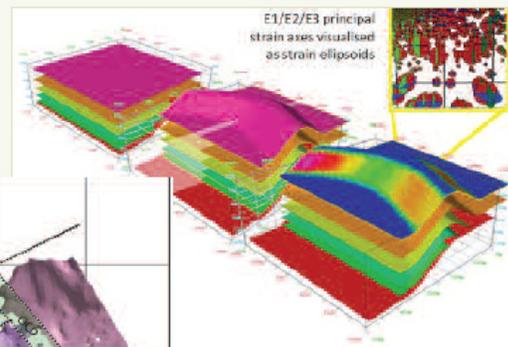
This 2-day course is designed for Geologists in Mineral Exploration and Resource Development and their Managers who want to minimize geological risk and optimize the use of regional and mine-scale geological models. The course is particularly useful for people working with structurally controlled deposits and/or deposits that have been deformed.

Topics covered during the two days:

- Philosophy of modeling structural evolution: 3D plus time.
- Risk from prior knowledge, the use of uncertainty concepts.
- Overview of structural styles illustrated using selected mineralization systems and the role of mechanical stratigraphy, in extensional, contractional and strike-slip settings.
- Principles of structural modeling and validation: key tests.
- The big picture: constraints from geological context and regional structural history.
- Validating the fault framework, fault shapes and crosscutting relationships and identifying connected pathways.
- Linking igneous emplacement to fault-assisted space making mechanisms.
- Sequential restoration of folds, fault offsets and igneous intrusions in section.
- Constructing fault shape from surface data.
- Quantifying strain through time for geological fracture modeling, modeling block-size distribution.
- Case studies include the Bingham Canyon Mine Cu-Mo-Au porphyry and skarn deposit.



From: *Structural Setting and Synplutonic Fault Kinematics of a Cordilleran Cu-Au-Mo Porphyry Mineralization System, Bingham Mining District, Utah*. Kloppenburg, A., Grocott, J. and Hutchinson, D., 2010. *Economic Geology* v. 105, p. 743-761.



Instructors:
Jenny Ellis BSc MSc, Structural Geologist (Midland Valley)
John Grocott BSc PhD FGS, Principal Structural Geologist (Midland Valley)

REGISTER on the SEG website at www.segweb.org/events

Early Registration deadline Sept. 25, 2012	Late Registration after Sept. 25, 2012
Members (US\$ 795)	Members (US\$ 895)
Non-Members (US\$ 895)	Non-Members (US\$ 995)
SEG Students (US\$ 495)	SEG Students (US\$ 545)
Non-member Students (US\$ 545)	Non-member Students (US\$ 595)

**Please note that this course is limited to 50 participants (no more than 10% students). SEG reserves the right to cancel this event should minimum attendance numbers not be met by September 25, 2012.

Call for abstracts: NGWA Conference on Great Plains Aquifers: Beyond the Ogallala Omaha, NE • October 25-26, 2012

Abstracts must be submitted online at <http://ngwa.confex.com/ngwa/pgal2/cfp.cgi> and are due by 11:59 p.m. ET, June 29, 2012.

Few realize that the Great Plains Aquifers represent a microcosm of all the challenges facing water allocation and land management today. Negative impacts to this aquifer system have affected the domestic and international food supply and will continue to do so. The huge variations in the system's saturated thickness create challenges that affect the agricultural and domestic water supply. Water managers and policy makers must constantly question if the periods of record are truly reflective of current conditions. How is the aquifer system affected by changing land use and climate change—and what are potential solutions? Too often the research focuses on doing more with less instead of accurately valuing the water being conserved in context of how it is used. How can having different jurisdictions and water policies be reconciled for effective resource management to provide support instead of mandates?

This conference is focused on bringing together the diverse communities with interest in long-term water planning and management—and how collective expertise can be shared and best practices implemented. How can we be well-prepared to meet the conditions we face and how quickly can we adapt if conditions change? To prepare and assist in planning for the great unknowns to sustain the aquifer system for the longest period of time, NGWA is seeking abstracts on such topics as:

- » Groundwater Withdrawals and Water Quality
 - » Agriculture and irrigation
 - » Impacts of hydraulic fracturing and deep well disposal of fluids
 - » Production of bioenergy and food production
 - » Impact of current withdrawals on future demand
- » Sustainable Economy and Conservation
 - » Perception (and reality) of how a given water policy provided economic (competitive) advantage
 - » Whether or not irrigation efficiency has contributed to conservation
 - » Project planning and stakeholder communication
- » High Capacity Wells and Irrigation
 - » How can we initially design and manage better?
 - » Conflicting rules and practices
- » The Impact of Changing Land use Climate Change
 - » Relationship between surface water and groundwater
 - » Dams, levees, and reservoir systems
- » Groundwater Rights
 - » What's working and what's presenting problems
 - » Challenge of different managing authorities
 - » Interstate agreements on water rights
 - » Federal programs vs. different doctrines

- » Tribal interests
- » The real world and competing demands
- » Recharge of Water
 - » Water quality
 - » Potential for aquifer storage and recovery
 - » River and wetland restoration projects

<http://www.ngwa.org/aquifers>

84th Annual Meeting of the Eastern Section of the Seismological Society of America

Blacksburg, Virginia • October 28-30, 2012

Call for Papers

Oral and poster presentations are welcomed in all areas of seismology, earthquake engineering, crust and upper mantle structure of eastern North America, emergency response and preparedness, earthquake hazard mitigation, earthquake education, or any topic consistent with the objectives of the Seismological Society of America. Papers relevant to eastern North America and student papers are particularly encouraged. Abstracts must be submitted for all presentations.

To submit an abstract, visit the SSA website:

<http://www.seismosoc.org/>

Important Dates

- » Student Travel Grant Application Deadline: September 21, 2012
- » Abstract Submission Deadline: September 21, 2012
- » Hotel Room Block Reservation Cut-Off: September 27, 2012
- » Online Registration Cut-Off: (on-site registration will be available) October 21, 2012





2012 GSA ANNUAL MEETING & EXPOSITION

4–7 NOVEMBER 2012 • CHARLOTTE, NORTH CAROLINA, USA

www.geosociety.org/meetings/2012

Every year some 6,000 people—from every geoscience discipline and every stage of career development—make the decision to submit an abstract, take a few days off, spend some money, and attend the GSA Annual Meeting.

Why do they do it?

More importantly: *Why should you?*

- | | |
|-------------------------------------|--|
| 1. Diverse Technical Sessions | 4. Exhibition Hall Featuring over 200 Exhibits |
| 2. Scientific Field Trips | 5. Guest and Children's Programs |
| 3. Career Development Opportunities | 6. Network & Have Fun! |

Come to Learn. Stay to Play. Charlotte's Got a Lot!

Background photo: North Carolina Blue Ridge Mountains. Photo by Andy R. Bobyarchick, 2008.

Join GSA in helping to celebrate its 125th Anniversary.

There will be events throughout the year in 2013!

Consider attending a Section Meeting

(www.geosociety.org/sections/meetings.htm).

Abstract deadlines for the 2013 spring meetings start as early as 11 December 2012.

For more information on GSA's 125th Anniversary activities, go to

www.geosociety.org/125/.



Women's Network Breakfast 2012 Society of Exploration Geophysicists (SEG) Annual Meeting

Las Vegas, Nevada • November 4-9



The Society of Exploration Geophysicists (SEG) Women's Network was formed in 2011, with the mission to:

- » promote greater female engagement in SEG activities,
- » create a community for mutual support among female SEG members,
- » enhance recruiting of women to the profession, and
- » improve retention of women in the industry.

The Women's Network's activities are coordinated by the SEG Women's Network committee. One of the first actions taken by the Committee was the creation of an on-line community, <http://www.seg.org/web/seg-womens-network>. The Committee invites and encourages all SEG members to submit information, ideas and resources that would interest and benefit the group. The Women's Network is also represented on other on-line platforms, such as Facebook and LinkedIn.

In addition to its on-line presence, gatherings at annual and regional meetings form a means to establish connections for support, collaboration and mentoring. The first Women's Network gathering was successfully held at the 2011 SEG Annual Meeting.

This year, the SEG Women's Network committee is pleased to announce the second annual Women's Network breakfast, which will be held on Wednesday, November 7, 2012, from 8:00 to 10:30 am at the 2012 SEG Annual Meeting in Las Vegas, Nevada. Our guest speaker is Marcia McNutt, Director of the U.S. Geological Survey, followed by roundtable discussions on Women in Geophysics.

Breakfast will be provided. All who are interested – men and women – are welcome to join. Please sign up at <http://www.seg.org/web/seg-womens-network/rsvp>, as capacity is limited to the first 110 registrations.

This event is sponsored by ExxonMobil, Chevron, Statoil, Fugro, and Anadarko.

Kirkham Conference

New Zealand • November 28-30, 2012



Registration is now open for the 2012 Kirkham Conference "Contemporary Challenges in Soil Physics Research," in New Zealand, 28-30 November and sponsored by the Soil Science Society of America (SSSA).

Soil physics graduate students and early career SSSA members can apply for a Travel Grant by 23 July to attend the 2012 Kirkham Conference. Visit the Kirkham Conference Travel Grant page for application information and to apply: www.soils.org/meetings/travel-grant/kirkham.

Kirkham Conferences are meetings in which informal discussions encourage scientists to make seminal, in-depth explorations of disciplinary and interdisciplinary subjects of soil physics. Generally attended by 50 people or less, they provide timely development of newly emerging research ideas. Invited speakers will give keynote addresses on the contemporary soil physics' themes of: up scaling, defining the effective properties of soils, relating structure to function, water repellency and unstable flows, plants and soil, microbial diversity and ecological economics.

The 2012 Kirkham Conference is being held at Massey University, Palmerston North, New Zealand. Note that Early Bird registrations close on 1 September. Additional details about the conference are available online: www.soils.org/membership/divisions/s01/kirkham-conference-2012.

Don Kirkham (1908-1998) influenced in the past century developments in the field of soil physics. Colleagues and the Soil Science Society of America decided to commemorate Don and his wife Betty in a lasting way. They established the Don and Betty Kirkham Soil Physics Award and the Kirkham Conference, programs within the Soil Science Society of America, as a permanent tribute to this unforgettable couple.

For more information, contact the Kirkham Conference Chair Brent Clothier, brent.clothier@plantandfood.co.nz.

2012 Kirkham Conference
28-30 November, Palmerston North, New Zealand



SEG-CSM Sediment-hosted Zn-Pb-Ag Deposits Course

SEG Course Center, Littleton, CO, USA • 8-9 November, 2012

This workshop will present an overview of sediment-hosted Zn-Pb-Ag ores from syngenetic and diagenetic environments to high temperature carbonate replacement with a strong emphasis on exploration. The workshop will focus on clastic-dominated (SEDEX), Mississippi Valley-type, sandstone-hosted, salt diapir environments and high temperature polymetallic vein and carbonate replacement deposits. The course will review the origin of the ore fluids, metal solubility, transport and precipitation mechanisms, igneous associations, and alteration. Presentations on the geologic and tectonic controls on their distribution in the Earth's crust through time will provide insight into where and how sediment-hosted Zn-Pb-Ag deposits form and the implications for exploration. Classic sediment-hosted Zn-Pb-Ag deposits will be described and samples of ores and alteration products from around the world will be available for the participants to examine.



Early Registration deadline September 30, 2012:
Members (US\$ 495), Non-Members (US\$ 595),
SEG Students (US\$ 245), Non-member Students (US\$ 295)

Late Registration after September 30, 2012:
Members (US\$ 595), Non-Members (US\$ 695),
SEG Students (US\$ 295), Non-member Students (US\$ 345)

* Please note that this course is limited to 50 participants. SEG reserves the right to cancel this event should minimum attendance numbers not be met by September 30, 2012.

David L. Leach (SEG 1979 F) worked for the US Geological Survey for more than 30 years and is presently a consultant to the minerals industry. He has authored or coauthored more than 200 papers on the geology and geochemistry of ore deposits and is a recognized expert on sediment-hosted base metal deposits. His career focused on hydrothermal mineral-rock interactions with special interest on Mississippi Valley-type and CD (SEDEX) Pb-Zn deposits, ore formation in metamorphic environments, global metallogeny and deposit targeting using global geodynamics and secular distributions of ore deposits. David Leach also conducted research at the University of Paris VI as a High Level CNRS Visiting Scientist, at the University of Western Australia as a Glendon Research Fellow and is currently active as an Adjunct Professor at the University of Western Australia and Honorary Professor at the Chinese Academy of Geoscience. He served as President of SGA and was a SEG International Exchange Lecturer. He received a Meritorious Service Medal from the United States Department of the Interior and in 2010, received the Penrose Gold Medal from the Society of Economic Geologists.

Peter K.M. Megaw (SEG 1982 F) Consulting Exploration Geologist President of IMDEX/Cascabel and co-founder of Minera Cascabel and MAG Silver. His Ph.D. work at the University of Arizona was an exploration-focused geological/geochemical study of the Santa Eulalia Ag-Pb-Zn District, Chihuahua and Carbonate Replacement Deposits (CRDs) in general. He has published extensively on CRDs and is a frequent speaker at international academic and technical symposia. His primary exploration foci are CRDs, Epithermal Vein Deposits and Porphyry Copper Deposits and he and his team are credited with the significant discoveries at Juancipio-Fresnillo, Zacatecas; Platosa, Durango; and Cinco de Mayo-Pozo Seco, Chihuahua. Peter was awarded the Society of Mining Engineers 2012 Robert M. Dreyer Award for excellence in Applied Economic Geology and the Carnegie Mineralogical Medal for 2009.



Ore Reserve Estimates in the Real World

Three-day Workshop — November 28-30, 2012
SEG Course Center, Littleton, Colorado, USA

The reserve estimates that form the basis for final feasibility studies leading to the construction of a mine are, to a greater or lesser degree, almost invariably wrong. Unfortunately, the error is in only one direction. The tonnage of ore mined may exceed the tonnage predicted by the "feasibility reserve," but the grade of ore actually mined is almost invariably lower than the grade envisioned in the feasibility study. As a result, the financial profitability of the operation very rarely meets the feasibility forecast. This course is NOT a course in financial evaluation or geostatistics, although both of these subjects are discussed, nor is it a collection of "cookbook" recipes for reserve estimation. It is intended as a discussion of various aspects of reserve estimation that are often neglected in the real world, and which contribute to the above situation. Various exercises, mostly based on actual operations, are presented to illustrate points important to the evaluation of any mineral deposit. The course will be of interest to geologists dealing with the practical aspects of reserve estimation and mining engineers, as well as to decision-makers in economic geology in general. Course materials will include a copy of the latest edition of SEG's consistently well-received Special Publication Number 3 *Ore Reserve Estimates in the Real World*, by John G. Stone and Peter G. Dunn.



■ **Early Registration (until Oct. 31, 2012):**
Members (US\$ 995),
Non-Members (US\$ 1,095),
SEG Students (US\$ 595),
Non-member Students (US\$ 645)

■ **Late Registration (after Oct. 31, 2012):**
Members (US\$ 1,195),
Non-Members (US\$ 1,295),
SEG Students (US\$ 645),
Non-member Students (US\$ 695)

Please note that this course is limited to 30 participants. SEG reserves the right to cancel this event should minimum attendance numbers not be met by October 31, 2012.

JOHN G. STONE

John G. Stone received his undergraduate training at Yale University, and a PhD degree in economic geology from Stanford University. Following graduation, he joined the Hanna Mining Company as a staff geologist, and for the next 30 years served in various positions in exploration and mine geology, project management, mine development and financial analysis of new and existing mining ventures. In 1979 he was named manager of Hanna's Pilot Knob operation in Missouri, and from 1982 until 1989 served as Chief Geologist, Mineral Resources. During the course of his career, he has been involved with the exploration, evaluation, development or management of direct shipping, "taconite" and volcanogenic iron deposits, porphyry copper, copper-zinc VMS, magmatic copper-nickel, MVT lead-zinc, epithermal vein and disseminated gold, nickel laterites, and placer gold and gold-diamond deposits. He has worked in Canada, Mexico, Guatemala, Venezuela, Colombia, and Brazil.

PETER G. DUNN

Peter G. Dunn received a B.S. degree in geology from Yale University in 1955 and started work as a mining engineer at Miami Copper Company in Arizona. He received an M.Sc. degree in mining geology from Stanford University in 1958 and subsequently migrated to Australia where he worked for the Australian Bureau of Mineral Resources and Mount Isa Mines. After returning to the United States he worked in both North and South America, Australia and Asia for Kennecott, Quintana Minerals, Chevron Resources and as a consulting geologist in porphyry copper exploration and property evaluation.



**Detailed Mapping and Interpretation of Hydrothermal Ore Deposits:
Kingston Range, California and Cerbat Range, Arizona**

December 9-15, 2012

Course/Field Trip Description:

Professionals and graduate students interested in detailed-scale mapping of ore deposits, with emphasis on ore geochemistry and alteration mineral zoning. Exercises include detailed (1:480) mapping of Precambrian (Kingston Range) and Tertiary-age (Cerbat Range) rock units, and discussions involving the geochemistry of alteration assemblage development.

BILL CHÁVEZ

William Chávez has been a Professor of Geological Engineering at the New Mexico School of Mines since 1985. His teaching emphasizes the field aspects of geochemistry and alteration mineral assemblages in the interpretation and evaluation of mineral properties. Dr. Chávez has instructed field and in-class Workshops for the Society of Economic Geologists involving a variety of ore deposit types, with emphasis on the practical application of geochemistry to mineral exploration.

ERICH PETERSEN

Erich Petersen is a Professor of Geology & Geophysics at the University of Utah in the Latin American Studies Program. His Geographical Regions of Interest include Central America and South America. His degrees include a Ph.D. from the University of Michigan in 1984, a M.A. from Dartmouth College in 1979 and a B.A. at Harvard University in 1975. Erich Petersen has worked closely with the Society of Economic Geologists over the years through several Field Trips, Short Courses and Workshops.



Early Registration Deadline: November 10, 2012

Members (\$1,595) Non-Members (\$1,695)
SEG Students (\$895) Non-Member Students (\$945)

Late Registration:

Members (\$1,695) Non-Members (\$1,795)
SEG Students (\$945) Non-Member Students (\$995)

SEG reserves the right to cancel this event should minimum attendance numbers not be met by November 10, 2012. Number of Participants (Limit): 15

Arctic Technology Conference

December 3-5, 2012 Houston Texas

Registration continues for the Arctic Technology Conference, 3-5 December 2012 at the George R. Brown Convention Center in Houston. Organizers recently announced an addition to the Plenary Session lineup: Jostein Mykletun, Ph.D. Consul General of Norway, speaking on The Norwegian Arctic: Outlook and Perspectives. Mykletun joins an already impressive lineup of Plenary Session speakers that includes:

- » Jamie Balmer (Senior Analyst, Infield Systems Limited)
Arctic Oil and Gas: Stop or Go?
- » Michael Borrell (SVP Continental Europe and Central Asia, Total E&P) The Total Adventure in the Arctic
- » Robert Blaauw (Senior Advisor Global Arctic Theme, Shell) 2012 — A Pivotal Year for Arctic Oil and Gas

ATC features a science-rich program with more than 150 technical papers and posters. Sessions cover topics most applicable to the industry, such as Emissions, Discharge and Safety; Codes and Standards; Ice Surveys and Detection; Overview of Oil and Gas Activities in the Russian Arctic; Arctic Frontier Basins: Applications of Technology; Pipeline Technologies; Unmanned System Technology for Arctic Waters; Drilling Technologies in the Arctic; Shipping and Transport and more.

ATC also features a robust exhibition hall with 50+ exhibitors and topical breakfasts and luncheons that showcase presentations from top executives and technical experts. To view this year's line up please visit:

<http://www.expocad.com/host/fx/aapg/cat12ho/default.html>

The Houston-based Offshore Technology Conference's (OTC) Arctic Technology Conference is managed by the American Association of Petroleum Geologists and is supported by a dozen of the leading scientific organizations.

Sponsoring Organizations

- » American Association of Petroleum Geologists
- » American Institute of Chemical Engineers
- » American Institute of Mining, Metallurgical, and Petroleum Engineers
- » American Society of Civil Engineers
- » ASME International Petroleum Technology Institute
- » Institute of Electrical and Electronics Engineers — Oceanic Engineering Society
- » Marine Technology Society
- » Society of Exploration Geophysicists
- » Society for Mining, Metallurgy, and Exploration
- » Society of Naval Architects and Marine Engineers
- » Society of Petroleum Engineers
- » The Minerals, Metals & Materials Society

Endorsing Organizations

- » International Association of Drilling Contractors
- » Petroleum Equipment Suppliers Association



GEOS 2012

December 3-4, 2012

Hotel Fort Canning, Singapore

<http://geoearth.org/>

Conference Theme

As the only life-bearing planet, Earth provides resources and the exact conditions to make life possible. However, with the advent of technology and industrialization, the Earth's resources are being pushed to the brink of depletion. Non-sustainable industrial practices are not only endangering the supply of the Earth's natural resources, but are also putting burden on life itself by bringing about pollution and climate change.

A major role of earth science scholars is to examine the delicate balance between the Earth's resources and the growing demands

of industrialization. Through research and development, earth scientists have the power to preserve the planet's different resource domains by providing expert opinion and information about the forces which make life possible on Earth.

The conference will be constituted by a keynote, panel sessions, and presentations of all accepted papers. The keynote addresses "Atoll Island Groundwater at Risk: Simulating the Effects of Long Term Eustatic Sea-Level Rise and Cyclone-Driven Inundation" and "World Class Mineral Deposits - Sight and Insight" will be delivered by Dr. James P. Terry and Dr. M. S. Pandian, respectively.

Dr. James P. Terry is an Associate Professor for the Department of Geography, National University of Singapore. Dr. M. S. Pandian is a Professor for the Department of Earth Sciences at Pondicherry University, India. Please visit <http://www.geoearth.org/>.



A Karst Waters Institute Symposium on Carbon and Boundaries in Karst

January 7 - 11, 2013

Carlsbad, New Mexico

Co-sponsored by the National Cave and Karst Research Institute
Conference Web Site: www.nckri.org/kwi2013

Background

There is growing interest in the dynamics of both inorganic and organic carbon in karst systems, and especially in the flux of carbon and nutrients between the surface and subsurface and between different components in the karst subsurface. This symposium is about these and other questions connected to carbon in karst and boundaries in karst. It is especially timely both because of rapid advances in the field and the importance of carbon sequestration in global climate change. The symposium will highlight recent advances in biology, geology, and hydrology that are helping us understand the dynamics of karst ecosystems, especially with respect to carbon. There will be both invited lectures and contributed posters covering the following topics:

- » The Upper Boundary – Epikarst
- » The Lower Boundary – Phreatic Zone
- » Lateral Inputs — Insurgences
- » Lateral Outputs — Resurgences
- » CO₂ — Processing and Storage

- » Organic Carbon — Sources and Quality
- » Synthesis and Large Scale Models

As is the tradition with KWI meetings, the symposium will be aggressively interdisciplinary and international. More information about KWI and past meetings can be found at www.karstwaters.org.

Scientific Program

Two distinguished scientists will give plenary lectures to set the framework for the meeting:

- » Dr. Jack Stanford, Director of the Flathead Lake Biological Station in Montana, one of the discoverers of the hyporheic zone, and co-editor of the "bible" of groundwater ecology, aptly titled Groundwater Ecology.
- » Dr. John L. Wilson, Professor of Hydrology at New Mexico Tech, a leading expert on stream-aquifer interactions and the movement of materials through groundwater.

Two distinguished karst scientists will give a first-of-its-kind joint summary of the meeting:

- » Dr. Derek C. Ford, Professor of Geography and Earth Sciences at McMaster University and co-author of one of the two leading books on physical aspects of karst, Karst Hydrogeology and Geomorphology
- » Dr. William B. White, Professor of Geosciences at The Pennsylvania State University and co-author of the other leading book on physical aspects of karst, Geomorphology and Hydrology of Karst Terrains.

There will be seven thematic sessions with invited speakers. The program is being developed by the program chair, Dr. Daniel W. Fong:

- » *The Upper Boundary*, convened by Dr. Tanja Pipan, Karst Research Institute at ZRC-SAZU, Postojna, Slovenia. Confirmed speakers include Fengmei Ban (Shanxi University, China), Janja Kogovšek (Karst Research Institute, Slovenia), and Ioana Meleg (Emil Racoviță Institute of Speleology, Romania).
- » *The Lower Boundary*, convened by Dr. Franci Gabrovšek, Karst Research Institute at ZRC-SAZU, Postojna, Slovenia. Confirmed speakers include David C. Culver (American University), Pierre-Yves Jeannin (Swiss Institute of Speleology, Switzerland), Jonathan Martin (University of Florida), and George Veni (National Cave and Karst Research Institute).
- » *Lateral Inputs*, convened by Dr. Kevin Simon, The University of Auckland, New Zealand. Confirmed speakers include Jonathan Harding (University of Canterbury, New Zealand) and Michael Vernasky (University of Alabama).
- » *Lateral Outputs*, convened by Dr. Carol Wicks, Department of Geology and Geophysics, Louisiana State University. Confirmed speakers include Matthew Covington (University of Arkansas), Cene Fišer (University of Ljubljana, Slovenia), Daniel Fong (American University), Neven Kresic (AMEC Environment and Infrastructure).
- » *CO₂*, convened by Dr. Janet Herman, Department of Environmental Science, University of Virginia, Charlottesville, Virginia. Confirmed speakers include Daniel Kowalczyk (Florida State University) and Daoxian Yuan (Karst Dynamics Laboratory, Institute of Karst Geology and International Research Center on Karst Under the Auspices of UNESCO, Guilin, China).
- » *Organic Carbon*, convened by Dr. Annette Summers Engel, Department of Earth and Planetary Sciences, University of Tennessee, Knoxville, Tennessee. Confirmed speakers include Penny Boston (New Mexico Tech) and Christian Griebler (Helmholtz Zentrum Muenchen, Germany).
- » *Synthesis*, convened by Dr. Daniel W. Fong, Department of Biology, American University, Washington, D.C. Confirmed speakers include Diana Northup (University of New Mexico), Kevin Simon (University of Auckland, New Zealand), and Carol Wicks (Louisiana State University).

A few slots are still available for oral presentations. Please contact Daniel Fong (dfong@american.edu) if interested.

Poster Sessions

In addition to the invited sessions, there will be two evening poster sessions. Contributions on all topics related to carbon and boundaries in karst are welcome. Each attendee may present up to three posters. Maximum poster size is 120 cm (4 feet) by 90 cm (3 feet). Abstracts of posters may also be submitted for publication in the conference program. Abstracts are limited to 300 words or less. Send abstracts to Daniel Fong (dfong@american.edu).

Venue

The meeting will be co-sponsored by and held at the new headquarters of the National Cave and Karst Research Institute

(www.nckri.org) The goals of the National Cave and Karst Research Institute are to:

- » Advance cave and karst science by conducting, coordinating, and facilitating research.
- » Serve as a repository for and provide analysis and synthesis of speleological (cave related) information.
- » Foster partnerships and cooperation in cave and karst research, education, and management programs.
- » Promote and conduct cave and karst educational programs.
- » Promote national and international cooperative programs that further cave and karst research, education, and stewardship.
- » Develop and promote environmentally sound and sustainable cave and karst management practices.

The meeting site is close not only to Carlsbad Caverns National Park but also Guadalupe Mountains National Park, and makes an ideal starting place for a visit to the many parks and features of the U.S. desert southwest. Participants will be housed in nearby hotels in Carlsbad.

The nearest major airport is El Paso, Texas, approximately 2.5 hours from Carlsbad. Shuttle buses to and from the El Paso airport will be available on January 6 and 12 for a cost of \$50 one way. Smaller airports are located in Hobbs and Roswell, New Mexico, about 1 hour's drive from Carlsbad. Rental cars are available at all airports. There is an U.S. Immigration and Naturalization checkpoint between El Paso and Carlsbad, so be sure to have identification with you.

Mid-Conference Excursion

On Wednesday, January 9, we will have an all day excursion to Carlsbad Caverns National Park, a World Heritage Site, for a tour of Carlsbad Caverns and either a hike in Slaughter Canyon or a tour of Slaughter Canyon Cave. Carlsbad Caverns National Park is one of three national parks developed around a cave, the other two being Wind Cave and Mammoth Cave. Carlsbad Caverns is specially known for the beauty and extent of its formations, and the large flights of Mexican free-tailed bats that occur in the summer. The park contains excellent examples of southwestern American desert landscape as well. The cost of the mid-conference excursion is included in the registration fee.

Post-Conference Excursion

Plans are in the works to offer a post-conference excursion to Grand Canyon National Park and the surrounding areas, including Las Vegas. Details and registration information are available on the conference web site: www.nckri.org/kwi2013. The deadline for registration for the post-conference excursion is October 15, 2012. This deadline is much earlier than other deadlines for the conference.

Post-Conference Publication

All participants will be invited to submit a paper, due at the end of the conference, January 11, 2013. The paper must be in accordance with the style requirements of *Acta Carsologica*.

January 2013 January 2013 Meetings January 2013

Detailed information on style requirements can be found at <http://carsologica.zrc-sazu.si/?stran=guidelines>. Each paper will be limited to 5000 words and 8 tables/figures, without prior arrangement with the editor. Review papers are especially welcome. Papers that do not follow the style guidelines will be returned without review. All papers will be subject to peer review and submission does not guarantee publication. In a few exceptional cases, papers based on a poster will be considered for publication in the special issue of Acta Carsologica. There will be a two-step acceptance procedure. It first must be accepted by the Special Editor (David Culver) and then by the journal editor (Franci Gabrovšek). For further information contact David Culver (dculver@american.edu).

The anticipated publication date is October, 2013.

Registration Information

Registration fee for the meeting will be \$500 (\$300 for students), which includes all lunches, a Monday evening reception, a Friday banquet, and the Wednesday excursion to Carlsbad Caverns National Park. Participants will also be provided with the special issue of Acta Carsologica. The program and book of abstracts will be made available to participants on a digital memory stick at the registration desk. Additional fees will be charged for airport transportation and the post-conference excursion. Housing is not included, and information on local motels and rates will be provided in the third circular.

Timetable

June 1, 2012—online registration opens

November 1, 2012—abstracts due

December 1, 2012—registration closes. Late registration fees will be \$600 (\$400 for students).



The 24th Colloquium of African Geology



The Ethiopian Geoscience and Mineral Engineering Association (EGMEA) calls for your participation. Please submit your abstract, register online, actively engage in the field excursions, and sponsor this mega event. For further information, please visit the official website of CAG24. www.cag24.org.et

The 14th Congress & 40th Anniversary of The Geological Society of Africa (GSAf)

08-14 January 2013

UN Conference Centre
Addis Abeba, Ethiopia

Theme:

40 years of GSAf (1973-2013),
Earth Science Solutions
to
African Development Challenges.

More information at : <http://www.cag24.org.et>

CAG24 is expected with:

More than 10 major scientific sessions;
Various short courses and workshops,
About eight geological field excursions;
More than 500 delegates across the globe;
A number of exhibitors from the Mining industry and geosciences, publishers, scientific instrument manufacturers, professional societies and international organizations.
Cag24 is a perfect venue for all geoscientists for lasting cooperations and interactions.

Book your calendar now !!

Invitation for Sponsorship
A sponsorship prospectus is prepared and could be downloaded from the website. The CAG24 will give unforgettable experience and opportunity for all delegates through its diversified sessions, short courses and field excursions to many of the Ethiopian geological environments.

Conference Secretariat EGMEA Secretariat

School of Earth Sciences, AAU R# 121
P.o.Box 32739, Addis Abeba, Ethiopia
Tel: +251 -1-6554176 / +251-912084503

General Communications:

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egmea4geoscience@gmail.com

Scientific Programs:

EMail: asfawossena@gmail.com

Field Excursions:

EMail: seifukebede@yahoo.com

2013 | Geo-Congress

San Diego, California • March 3-6



STABILITY AND PERFORMANCE OF SLOPES AND EMBANKMENTS III

Stability and Performance of Slopes and Embankments III

March 3-6, 2013

San Diego, CA

www.geocongress.org

Sharpen your skills. Share your knowledge. Be a part of the Geo-Institute's 2013 Geo-Congress. Set your sights on an in-depth 3½-day exploration of the most relevant issues in:

- » Characterization of Rock and Rock Slopes
- » Design, Analysis and Performance of Rock Slopes and Rock Fills

- » Reliability Analysis and Reliability-Based Design for Earth and Rock Slopes, Dams and Levees (In Memory of Wilson Tang)
- » Instrumentation for Monitoring and Condition Assessment of Soil and Rock Slopes
- » Reconnaissance Observations and Monitoring of Soil and Rock Slopes for Documenting Geotechnical Performance
- » Vulnerability and Risk Assessment for Soil and Rock Slopes (In Memory of Wilson Tang)

...Plus, all you've come to expect from the annual G-I Congress.

Registration opens in mid-October.

SSA 2013 Annual Meeting Announcement

Salt Lake City, Utah - 17-19 April 2013

www.seismosoc.org

SSA's 2013 Annual Meeting will provide a stimulating exchange of research on a wide range of topics with colleagues from all over the world. Oral presentations, poster sessions, exhibits, field trips, business meetings and social gatherings all provide participants the opportunity to meet and share with their peers.

The Annual Meeting will focus on seismotectonics and hazards in the western U.S., including syntheses of results derived from the enormous volume of Earthscope data. However, sessions are encouraged from across the broad fields of earthquake science, geotechnical and earthquake engineering, and seismology.

Topics of interest may include (but are not limited to):

- Recent giant earthquakes
- Citizen seismology

- Earthquake early warning systems
- Advances in array seismology
- Imaging Earth's interior from crust to core
- Physics of seismic sources
- Paleoseismicity studies
- Urban earthquake hazards
- Issues related to siting nuclear or other critical facilities
- CTBT and nuclear monitoring issues
- Emergency management issues associated with large earthquakes

Abstract submission will begin 3 December 2012 thru 10 January 2013. The Program and Abstracts will be posted online 08 February 2012. For meeting contact information and submission details, please visit the 2013 Meeting page of the SSA website (<http://www.seismosoc.org/meetings/2013/index.php>).

The 2013 SSA Annual Meeting will be held at Salt Palace Convention Center in downtown Salt Lake City. Exhibit space and sponsorship opportunities for the meeting are available; please contact Katie Kadas at Katie@seismosoc.org for further information.

13th Multidisciplinary Conference on Sinkholes and the Engineering and Environmental Impacts of Karst!

Carlsbad, New Mexico • May 6-10, 2013

We are excited and happy to announce that the website is up and the call for abstracts has begun for the 13th Multidisciplinary Conference on Sinkholes and the Engineering and Environmental Impacts of Karst! More commonly called "The Sinkhole Conference," since 1984 this excellent series of meetings has been pivotal in bringing together engineers, geologists, geophysicists, and regulators to exchange ideas and enhance everyone's understanding of the challenges of living in karst areas.

The National Cave and Karst Research Institute (NCKRI) is honored to have been given management of this conference series, and it still operated by the Organizing Committee made

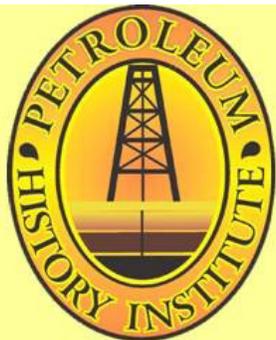
up of people who have hosted this conference for years, including representatives of sponsoring organizations like P.E. LaMoreaux and Associates, U.S. Geological Survey, Illinois State Geological Survey, Barton Springs/Edwards Aquifer Conservation District, and many others. If your organization is interested in being a sponsor or exhibitor, please contact us.

The conference will be held in Carlsbad, New Mexico, at NCKRI Headquarters, on 6-10 May 2013. This is the most westerly venue for the conference to date, and an excellent opportunity for the field trip and sessions to focus on evaporite karst and karst management in arid environments, as well as the wide range of other topics.

You can access the website through the NCKRI website's "Events" tab at www.nckri.org or directly at <http://sites.google.com/site/sinkholeconference2013/>. To submit an abstract, click on "Call for Abstracts" in the upper right side of the home page. The abstract deadline is August 15th!

Over the next month or so we'll add much more information to the website and begin registration. We'll send another message at that time.

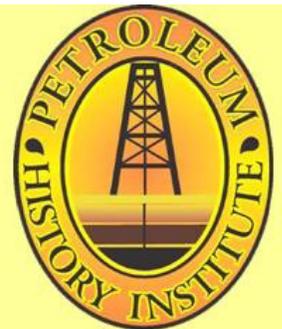
See you in Carlsbad in one year! ■



PETROLEUM HISTORY INSTITUTE

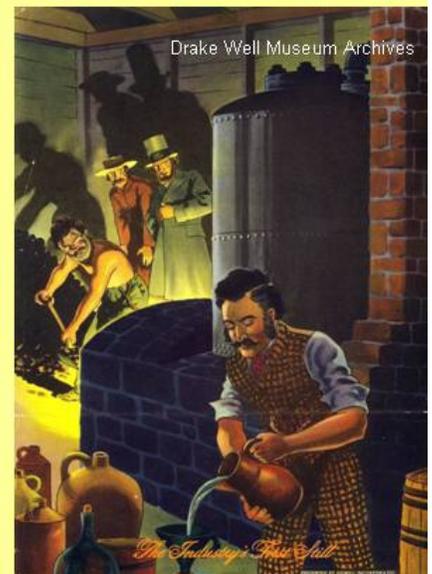
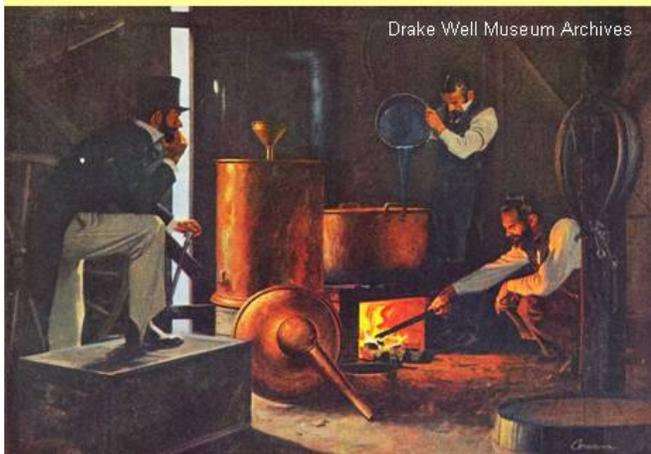
CALL FOR PAPERS PITTSBURGH, PENNSYLVANIA

Birth place of U. S. Refining
May 16-18, 2013



Please submit abstracts, oral and poster, to: William R. Brice (wbrice@pitt.edu)

DEADLINE: **APRIL 1, 2013** www.petroleumhistory.org



2013 NSS Convention

August 5-9, 2013 Shippensburg University, PA

<http://nss2013.com/>

13 Reasons to Attend the 2013 NSS Convention

- » Explore Civil War History at Gettysburg & Antietam battlefields
- » Tour the State Museum and State Capitol. Stop at Pittsburgh's Carnegie Museum of Natural History
- » Play at Hershey Park amusement park - think chocolate!
- » Ride on America's longest continuously operating Steam Railroad
- » Visit one of the NSS' 13 cave preserves - the Tytoona Cave Nature Reserve
- » Find Frontier Forts, the Liberty Bell and more!
- » Discover one or more of our nine show caves!
- » Bike the Cumberland Valley Rail Trail or hike the Appalachian Trail
- » Visit one of our 120 State Parks or one of our 20 State Forests

- » Go fishing in limestone spring-fed rivers
- » Tour Pennsylvania Dutch country
- » Cave Pennsylvania! We have more than 1,500 caves and shelters.
- » Walk under a cable ladder, upon an umbrella in a cave, or MISS the 2013 CONVENTION - 13 YEARS BAD LUCK!



**Deadline for abstracts:
June 4, 2013**

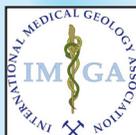


**Early registration deadline:
July 22, 2013**

MEDGEO 2013 **5th International Conference on Medical Geology**

**The Natural Environment & Health:
*Hidden Dangers, Unlimited Opportunities***

August 25-29, Hilton Crystal City Hotel, Arlington, VA



For additional information please visit:

http://rock.geosociety.org/GeoHealth/MEDGEO_2013/Welcome.html

Whistler 2013: Geoscience for Discovery

Society of Economic Geologists and SEG Canada Foundation

www.seg2013.org



September 24–27, 2013
Whistler, BC

TOPICS

- GLOBAL VIEW** Tectonics, Terranes and Metallogeny
– the geoscience building blocks
- REGIONAL VIEW** Metallogenic Provinces and Belts
– regional and deposit controls
- DEPOSIT VIEW** Discovery – ideas, geoscience data and technology producing results

PRELIMINARY PROGRAM OVERVIEW

PRE-CONFERENCE Field Trips • Short Courses

TUESDAY, SEPTEMBER 24

- Registration opens
- Welcome Reception

WEDNESDAY, SEPTEMBER 25

- Tectonics, terranes and metallogeny
- Arc terranes
- Regional metallogeny – China, Mongolia and Russia

THURSDAY, SEPTEMBER 26

- Regional metallogeny – classic districts
- Regional metallogeny – western North America
- Regional metallogeny – the continental margin

FRIDAY, SEPTEMBER 27

- Exploration, Discovery and Deposits I
- Exploration, Discovery and Deposits II

POST CONFERENCE

- Field Trips • Short Courses

THE CONFERENCE:

The technical program will focus on those areas of academic research in economic geology that lead to the important practical issues of improved exploration concepts, technologies and, ultimately, discovery. Three days of technical talks will be supplemented by related poster sessions, field trips and short courses.

ABSTRACT SUBMISSION

The Whistler 2013: Geoscience for Discovery Conference Technical Program Committee invites you to submit an abstract for presentation at the conference. Abstracts will be accepted for oral presentations and poster displays. The deadline to submit an abstract is **March 31, 2013**. SEG student members whose abstract is accepted are eligible to apply for financial support to attend the conference. All submitted abstracts will be reviewed by at least three reviewers. Notification of abstract acceptance or rejection will be sent in the first week of June 2013. Visit <http://www.seg2013.org/submit-an-abstract> to submit your abstract online.

IMPORTANT DATES

September, 2012	Online abstract submission opens
January, 2013	Registration opens
March 31, 2013	Abstract submission deadline
June 30, 2013	Early Bird registration closes
July 31, 2013	Presenting Author registration deadline



Whistler 2013: Geoscience for Discovery
September 24–27, 2013 • Whistler, BC

www.seg2013.org

FIELDTRIPS

Join us before or after the conference for one of the following exciting Field Trips to enhance your conference experience.

- **Alaska:** Tour of advanced and historic gold deposits in eastern Alaska — *September 21–24, Curt Freeman*
- **Mexico:** Tour of new and historical mines of the Mexican Altiplano — *September 19–24, Erme Enriquez*
- **Vancouver Island - Myra Falls:** Mine tour of Myra Falls with field stops to visit local outcrops of interest in Sicker Group volcanics — *September 23–24, Rick Sawyer and Tyler Ruks*
- **Bralorne:** One day tour of BC's most prolific and recently reactivated gold mine — *September 28, Matt Ball*
- **Nevada - Carlin Trend:** Tour of Northern Nevada with a mix of classic Carlin deposits and recent discoveries — *September 28 – October 4, Moira Smith*
- **Porphyry Systems of Central and Southern BC:** Tour of central BC porphyry deposits from Prince George to Princeton — *September 28 – October 3, Jim Logan and Tom Schroeter*



Note: Field trips are subject to confirmation and minimum numbers. More details about the trips are available on www.seg2013.org.

SHORT COURSES

Extend your conference experience by attending one of the following Short Courses.

- **Gold Deposits: Their Structure and Setting:** This two-day short course will review the structure, style, architecture and ore shoot controls in gold only and gold-silver deposits, with particular emphasis on orogenic (mesothermal), epithermal, Carlin/Carlin-like and intrusion-related gold deposits.
- **Understanding Alteration: use in exploration and development:** This course will use comprehensive case studies from a variety of environments to demonstrate the importance of interpreting alteration as part of integrated exploration targeting. The application of alteration mineralogy to geometallurgy will be introduced.
- **Exploration Geochemistry:** Topics covered in this course will include primary dispersion, secondary environment, seeing through cover, geochemical survey design, data validation and QA/QC, data interpretation and data visualization and spatial representation.
- **Exploration Geophysics** • **Exploration Undercover Techniques**

Note: Short courses are subject to confirmation and minimum numbers. More details about the courses are available on www.seg2013.org.

SPONSORSHIP OPPORTUNITIES

Sponsorship and exhibit opportunities are numerous and provide maximum exposure for your company or organization. Please visit www.seg2013.org to download the Sponsor Prospectus.

By sponsoring SEG 2013, not only will you be supporting the strongest economic geology technical program to be presented in Canada in many years, but you will be supporting and encouraging students, the key to the future of our industry.

CONFERENCE EXECUTIVE COMMITTEE

- Gerry Carlson**, Conference Co Chair
President – SEG Canada Foundation
- Craig Hart**, Conference Co Chair
Director, Mineral Deposit Research Unit (MDRU)
– University of British Columbia
- Brian Hoal**, SEG Representative
Executive Director – Society of Economic Geologists
- John Thompson**, Technical Program Co Chair
PetraScience Consultants Inc.
- Murray Hitzman**, Technical Program Co Chair
Charles F. Fogarty Professor of Economic Geology – Colorado School of Mines
- Ian Walton**, Treasurer
Executive VP & CFO – Aurizon Mines Ltd.



2014 Geo-Congress: Call for Abstracts

February 23-26, 2014

Atlanta, Georgia

Proposal Deadline: October 17, 2012

The Geo-Institute is now accepting proposals in the area of Geo-characterization and modeling for sustainability for its 2014 Geo-Congress.

This annual congress "Geo-Characterization and Modeling for Sustainability" will be packed with extremely useful and relevant technical and career information covering the broad spectrum of the geo-profession. Several sessions, panel discussions, and keynote lectures will feature the Geo-Characterization and Modeling for Sustainability theme.

Guiding Threads of Content for the 2014 Congress

- Geo-Characterization
- Innovation, Standardization & Regulation
- Numerical & Resilience Modeling
- Sustainable Design, Visualization & Communication

For information:

<http://www.asce.org/geo/Conferences/Conferences/w>

Director of Geoscience Policy

American Geosciences Institute

The American Geosciences Institute (AGI), a nonprofit federation of 50 geoscience societies representing 250,000 geoscientists in the United States, is seeking a Director of Geoscience Policy.

This position is responsible for all phases of AGI's government affairs activities through its Geoscience Policy program and works actively with AGI's Member Societies, the Congress, and federal agencies to bring improved science into the decision-making process of public policy. The program serves as a focused voice for the shared policy interests of the geoscience profession. The Director monitors and analyzes legislation and policy developments affecting the geosciences, engages with other science societies and stakeholders in several coalitions supporting various federal agencies and programs, develops AGI congressional testimony and policy positions on national geoscience issues, manages both the Congressional fellow and internship programs, and coordinates the preparation of a document every presidential election cycle for the administration and policy makers detailing critical geoscience public policy issues.

Candidates should have an advanced degree in the geosciences and relevant professional experience in science and public policy. Outstanding and timely written, verbal, and organizational skills are a must.

Candidates should submit a resume, including salary requirements and the name of three references, with cover letter to Geoscience Policy Director Search, 4220 King Street, Alexandria, VA 22302-1502 or jobs@agiweb.org. For more information on the program, see www.agiweb.org/gap. Applications will be considered on a continuous basis until the position is filled.

Director of Development

Geological Society of America Foundation

Full-time position available at the Geological Society of America Headquarters, Boulder, Colorado.

The Director of Development has responsibility for individual fund-raising on behalf of the GSAF, reports directly to the President of the Foundation, and serves at the pleasure of the President and the Board of Trustees.

Please find a complete position description, required experience and qualifications, and how to apply, at

<http://www.geosociety.org/humanres/1209gsaf.htm>.

Applications will be reviewed as submitted until the position is successfully filled.

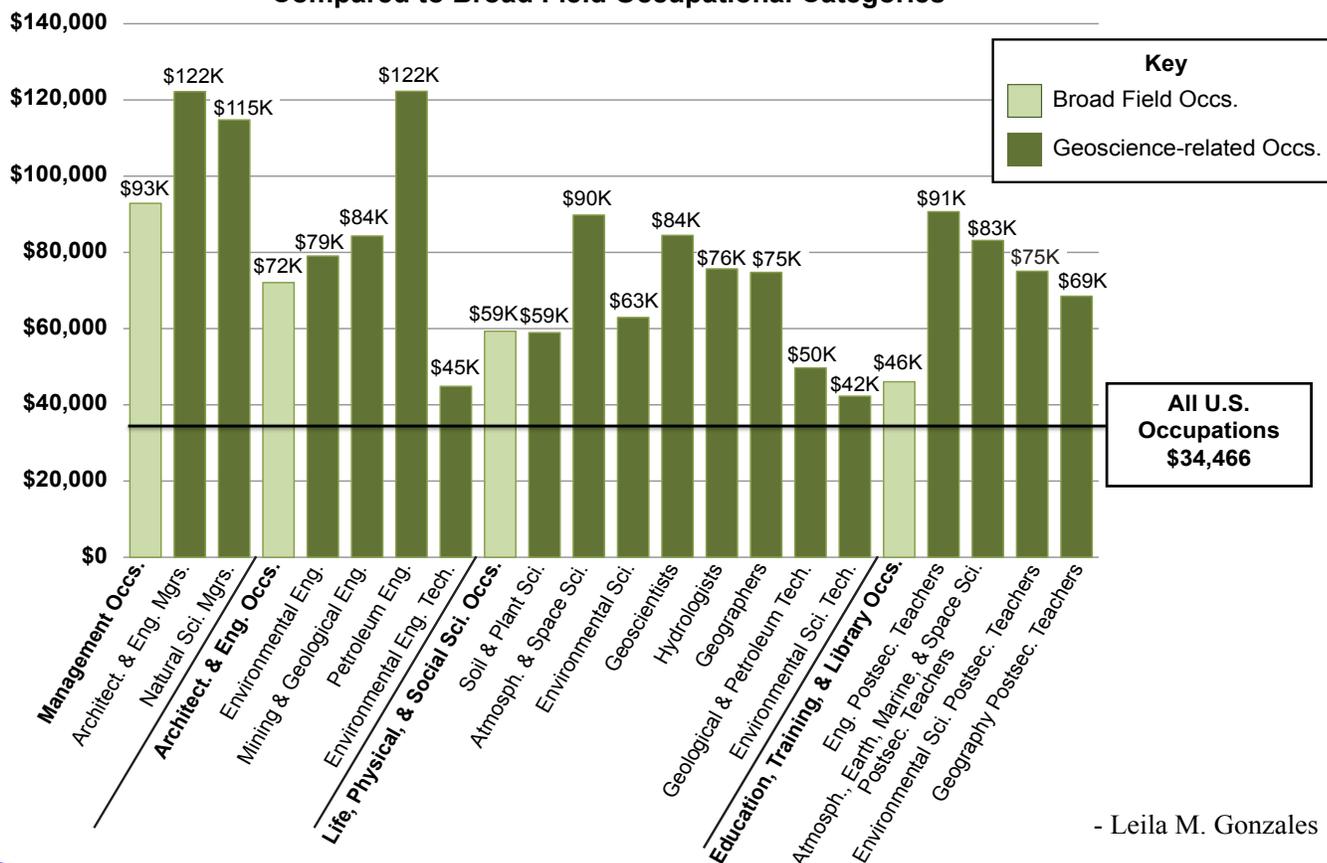
2011 Median* Salaries for Geoscience-related Occupations

Median salaries for non-technician, geoscience-related occupations outpaced broad occupational category salaries in 2011. Salaries for geoscience-related management occupations were 24-32% higher than salaries for all management occupations, while geoscience-related engineering occupations outpaced salaries for all architecture and engineering occupations by 10-70%. Geoscience-related scientific disciplines outpaced salaries for all Life, Physical, and Social Science salaries by 6% (Environmental Scientists) to 51% (Atmospheric and Space Scientists). In addition, geoscience-related postsecondary teacher salaries outpaced Education, Training and Library occupations by 49-97%. Although the majority of median salaries for geoscience-related occupations decreased by less than 3% between 2010-2011, over the past five-years (2007-2011), the majority of median salaries of geoscience-related occupations increased between 1-9%, with Petroleum Engineering salaries seeing the largest growth over the period, and Environmental Engineering salaries seeing the smallest growth.

*The 2011 median salaries for geoscience-related occupations are on average 7% (+/- 4%) lower than the corresponding mean salary. We use median salaries because salary data are often asymmetrically distributed, and thus the median values give better estimates of centrality or a "typical" salary of an occupation.

To view this data interactively, and explore median salary changes for 2010-2011 and 2007-2011, visit:
http://public.tableausoftware.com/views/2011_Geoscience_Salaries/2011GeoscienceSalaries

2011 Median Annual Salaries for Geoscience-related Occupations Compared to Broad Field Occupational Categories



- Leila M. Gonzales

Data derived from U.S. Bureau of Labor Statistics, Occupational Employment Statistics May 2011 data tables.

**Competitive *Median Salaries Across Industry Sectors for
Geoscience-related Occupations in 2011**

The most recent salary data from the U.S. Bureau of Labor Statistics indicate that geoscience-related occupations have competitive salaries across a variety of industry sectors. Petroleum Engineers and Natural Science Managers have the largest range in median salaries across industries (\$84,770 - over \$187,200 and \$73,290 - \$180,160, respectively). Petroleum Engineering occupations are found in nine broad-level industry sectors** and Natural Science Manager occupations are found in 15 broad-level industry sectors. Atmospheric, Earth, Marine and Space Science Postsecondary Teachers and Geography Postsecondary Teachers have the smallest range in median salaries (\$78,820-\$84,590 and \$60,820-\$69,420, respectively), while Environmental Science Postsecondary Teachers have the largest range in median salaries (\$32,700-\$66,930) within the Education industry sector. Of the non-management geoscience-related occupations, Environmental Science occupations (e.g Environmental Engineers, Environmental Scientists, and Environmental and Environmental Engineering Technicians), Soil and Plant Scientists, and Geoscientist occupations are found in more than ten broad-level industry sectors.

*The 2011 median salaries for geoscience-related occupations by industry are on average 6% (+/- 5%) lower than the corresponding mean salary. We use median salaries instead of mean salaries because salary data are often asymmetrically distributed, and thus the median values give better estimates of centrality or a "typical" salary of an occupation. Note, this Currents includes more geoscience-related occupations (e.g. technicians and postsecondary teachers), and salary information than Currents #51.

**Broad-level industry sectors refer to the North American Industry Classification System (NAICS) 2-digit industry codes used by the U.S. Bureau of Labor Statistics. For more information see <http://www.bls.gov/bls/naics.htm>

2011 Salary Ranges for Geoscience-related Occupations Across Industries

Occupation	Salary Range	Industry with Lowest Pay	Industry with Highest Pay	Number of Broad-level Industries
Architectural and Engineering Managers	\$83,030 to \$146,210	Junior Colleges	Oil & Gas	18
Natural Sciences Managers	\$73,290 to \$180,160	State Government	Finance & Insurance	15
Environmental Engineers	\$54,250 to \$110,610	Health Care	Oil & Gas	13
Mining and Geological Engineers	\$72,200 to \$133,970	Nonmetallic Mineral Mining	Manufacturing	7
Petroleum Engineers	\$84,770 to exceeds \$187,200 ¹	State Government	Construction	9
Environmental Engineering Technicians	\$33,620 to \$76,110	Construction	Oil & Gas	11
Soil and Plant Scientists	\$45,850 to \$86,960	Other Services	Mngmt of Companies	11
Atmospheric and Space Scientists	\$72,260 to \$120,600	Mngmt of Companies	Manufacturing	8
Environmental Scientists	\$47,420 to \$94,960	Colleges & Universities	Federal Government	14
Geoscientists	\$61,000 to \$129,450	State Government	Oil & Gas	12
Hydrologists	\$61,950 to \$85,920	State Government	Mngmt of Companies	6
Geographers	\$54,600 to \$88,150	Colleges & Universities	Scientific R&D Svcs.	3
Geological and Petroleum Technicians	\$31,770 to \$78,120	Coal Mining	Manufacturing	10
Environmental Science Technicians	\$32,700 to \$66,930	Health Care	Utilities	12
Engineering Teachers, Postsec.	\$72,320 to \$93,070	Junior Colleges	Colleges & Universities	1
Atmosph., Earth, Marine, and Space Sci. Teachers, Postsec.	\$78,820 to \$84,590	Junior Colleges	Colleges & Universities	1
Environmental Sci. Teachers, Postsec.	\$54,070 to \$79,570	Junior Colleges	Colleges & Universities	1
Geography Teachers, Postsec.	\$60,820 to \$69,420	Junior Colleges	Colleges & Universities	1

¹ The U.S. Bureau of Labor Statistics reports this wage as "greater than \$90.00 per hour or \$187,200 per year"

Data derived from U.S. Bureau of Labor Statistics, Occupational Employment Statistics May 2011 data tables.

To view this data interactively and explore salary percentiles for specific combinations of industries and occupations, visit:
http://public.tableausoftware.com/views/2011_Geoscience_Salaries/2011GeoscienceSalaries

- Leila M. Gonzales

2011 Median and Starting Salaries for Geoscience-related Occupations

Across the U.S., the majority of geoscience-related occupations have competitive median salaries and starting salaries when compared to the median salaries of all occupations within the same state.* In 2011, median salaries for the majority of geoscience-related occupations were 30 percent higher than the median salary for all occupations within each state.

Starting salaries for geoscience-related occupations is available for 35 states, yet the currency of the data ranges from 2009 to 2012, with 20 states reporting data for 2011. Within these 20 states, the 2011 starting salaries for most geoscience-related occupations were over 10% higher than the median salary for all occupations within each state. Geoscience-related technician occupations generally have lower starting salaries and lower median salaries than the median salary for all occupations in most states.

*Cost of living adjustments, which are available for comparing two metropolitan areas, are not available for state-wide to state-wide comparisons. Thus, we compare salaries for geoscience-related occupations to salaries for all occupations within the same state to create a baseline for assessing the competitiveness of salaries for geoscience-related occupations.

To view this data interactively, explore starting salaries and salary percentiles by state, visit:
http://public.tableausoftware.com/views/2011_Geoscience_Salaries/2011GeoscienceSalaries



2011 Median Salaries for Geoscience-related Occupations

2011 Starting Salaries for Geoscience-related Occupations

	Median Salary Range	Percent of Median Salary for All Occupations in State		Starting Salary Range	Percent of Median Salary for All Occupations in State	
		Lowest Salary	Highest Salary		Lowest Salary	Highest Salary
Architect. & Eng. Mgrs.	\$90,080 to \$143,050	MT 206%	CA 271%	\$53,452 to \$100,901	KY 76%	RI 174%
Natural Sci. Mgrs.	\$55,090 to \$153,120	IN 76%	NJ 287%	\$56,256 to \$98,675	KY 85%	RI 168%
Environmental Eng.	\$61,890 to \$104,340	FL 101%	DC 71%	\$40,040 to \$68,890	FL 30%	RI 87%
Mining and Geological Eng.	\$56,660 to \$117,040	OH 74%	OK 295%	\$41,470 to \$77,480	TN 37%	ND 142%
Petroleum Eng.	\$59,880 to \$187,200 ¹	MO 92%	MA 338% ²	\$53,452 to \$135,120	WV 91%	MA 216%
Environmental Eng. Tech.	\$30,040 to \$68,280	IA -4%	NV 109%	\$23,678 to \$54,642	KY -22%	RI 48%
Soil and Plant Sci.	\$46,090 to \$81,200	KY 52%	MD 101%	\$32,210 to \$59,500	TN 6%	MD 47%
Atmospheric & Space Sci.	\$58,500 to \$113,240	NH 66%	NJ 186%	\$39,430 to \$79,050	WI 18%	MD 95%
Environmental Sci.	\$43,270 to \$112,230	MS 59%	DC 83%	\$26,326 to \$56,451	OK -11%	RI 53%
Geoscientists	\$31,520 to \$144,970	SC 5%	OK 389%	\$35,782 to \$60,057	WV 28%	OK 133%
Hydrologists	\$55,890 to \$94,110	SC 86%	CO 154%	\$47,091 to \$80,290	ID 56%	WV 187%
Geographers	\$54,960 to \$92,000	TX 71%	VA 153%	\$44,110 to \$61,390	PA 27%	MA 44%
Geological & Petroleum Tech.	\$33,440 to \$66,040	WV 19%	AK 54%	\$21,870 to \$36,780	UT -32%	MA -14%
Environmental Sci. Tech.	\$26,290 to \$61,950	DC -57%	NV 90%	\$24,088 to \$44,075	KY -21%	RI 20%
Engineering Teachers, Postsec.	\$66,610 to \$111,620	MN 83%	PA 221%	\$31,397 to \$75,742	WV 12%	NH 114%
Atmosph. Earth, Marine, & Space Sci. Teachers, Postsec.	\$44,720 to \$105,530	OK 51%	RI 186%	\$35,163 to \$79,990	KY 16%	RI 117%
Environmental Sci. Teachers, Postsec.	\$35,240 to \$119,610	IA 13%	WA 198%	\$24,363 to \$69,900	WV -13%	MD 73%
Geography Teachers, Postsec.	\$43,690 to \$91,310	OK 47%	CA 137%	\$26,680 to \$63,648	TN -12%	NH 80%

¹The U.S. Bureau of Labor Statistics reports this wage as "greater than \$90.00 per hour or \$187,200 per year". BLS reports 30 Petroleum Engineers in Massachusetts.

²Value based on salary of \$187,200. ³Percent different from the median salary for All Occupations (Standard Occupational Code: 00-0000) within the state.

State median salary data derived from BLS's Occupational Employment Statistics May 2011 data tables.

Starting salaries derived from state-level labor market information websites.

- Leila M. Gonzales
Quadriga Analytics, LLC

**AGI's National Geoscience Student Exit Survey, Spring 2012
Decision Points**

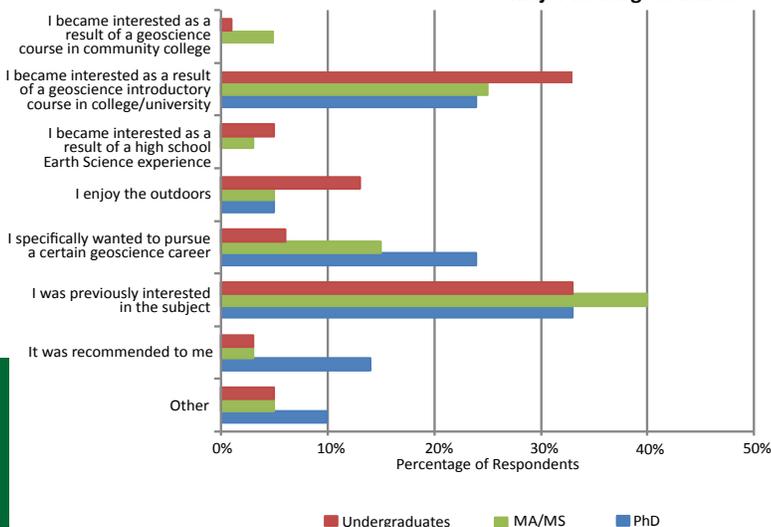
AGI's National Geoscience Student Exit Survey was developed to ascertain from geoscience degree recipients the relevant experiences in school and their immediate career plans upon graduation. In April 2012, AGI distributed the second pilot of this survey to geoscience departments willing to participate and received 294 full responses from 45 different departments. This Currents examines the results from two of the questions which inquire about the decision points for successful graduates pursuing a degree in the geosciences.

What was the most important reason for deciding to major in the geosciences?

Over 30% of undergraduate degree recipients decided on their major due to either an introductory geoscience course or because of an interest in the subject matter before entering school. Similarly, the majority of graduate students indicated these same two decision points for entering the geosciences.

In contrast, 24% of students graduating with a Ph.D. explicitly indicated an intent to pursue a career in the geosciences.

What was the most important reason for deciding to major in the geosciences?



For more information about the Exit Survey, please register for the AGI's National Geoscience Student Exit Survey--Spring 2012 Results webinar on October 5, 2012 (register: <https://www1.gotomeeting.com/register/425728400>). There will also be presentations at GSA's Fall Meeting in November 2012 and AGU's Fall Meeting in December 2012.

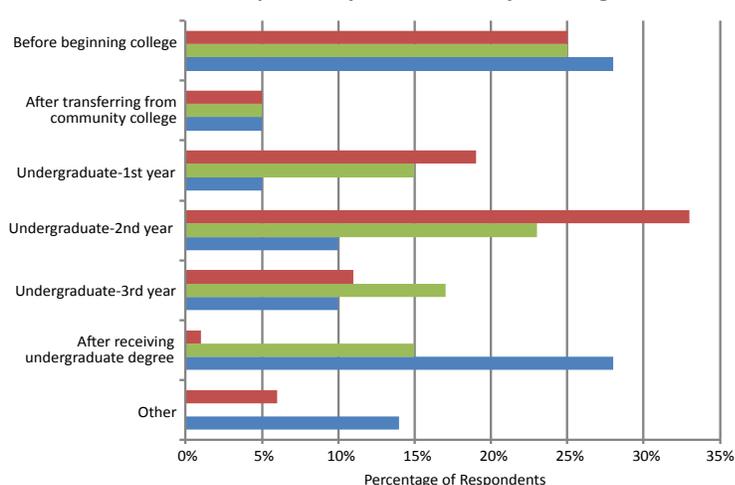
At what point did you decide to major in the geosciences?

Most students take introductory science classes during the first two years of their academic careers. Consistent with the above results, this graph shows that the majority of undergraduate degree recipients decided to major in the geosciences by their sophomore year.

Most Master's degree recipients decided to major either before college or during their second year as an undergraduate student, which is consistent with previous findings. However, nearly 15% decided on a geoscience Master's degree after completing an undergraduate degree.

Interestingly, over 50% of Ph.D. students decided to major in the geosciences either before college enrollment or after receiving their undergraduate degree.

At what point did you decide to major in the geosciences?



- Carolyn E. Wilson