

# GEOSPECTRUM

News from the Geoscience Community

Celebrate the International Year of Soils | The Discovery of Prudhoe Bay | Promoting Geoethics in Society: A New Challenge for Geoscientists | Realistic Advice for the New Geologist | Field Experiments for Methane Production from Hydrates

SPECIAL INSERT: Back from the Field; How to Succeed at the Best Student Geologic Map Competition

Spring 2015



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## Geospectrum

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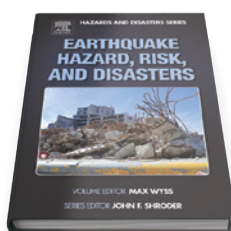




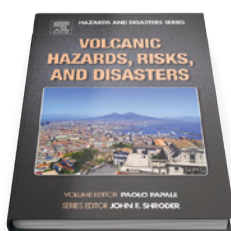
# Hazards and Disasters Series

**Editor-in-Chief, Dr. John F. Shroder**

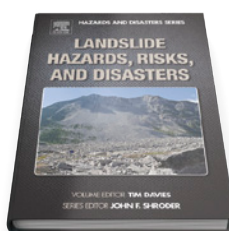
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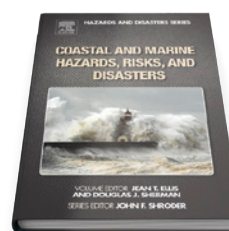
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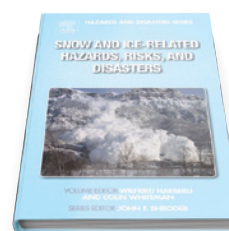
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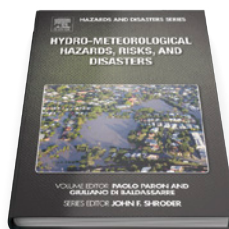
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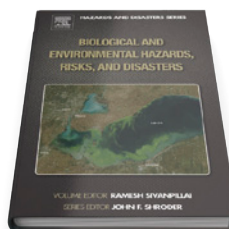
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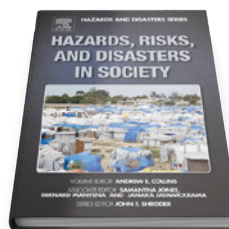
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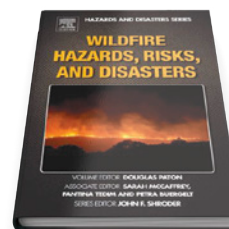
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Empowering Knowledge



## Dr. P. Patrick Leahy of the American Geosciences Institute awarded Prestigious Pick & Gavel Award

**Maureen Moses**  
**American Geosciences Institute**



**Dr. P. Patrick Leahy**  
Image Credit AGI

The Association of American State Geologists (AASG) has recognized the Executive Director of the American Geosciences Institute, Dr. P. Patrick Leahy with its prestigious Pick and Gavel Award. This award was initiated by AASG in 1999 to recognize distinguished friends of geology who have made major contributions to

advancing or facilitating the role that geoscience plays in our society.

"Many of the complex geoscience issues we face today are of significant interest to the public," Leahy said, "Indeed, earth-science problems often involve serious conflict, have costly and long-term consequences, require timely action on the part of a policy maker, and reveal significant gaps in our knowledge and understanding."

Following his Bachelor's and Master's degrees at Boston College, and a Ph.D. from Rensselaer Polytechnic Institute, he had a distinguished career at the U.S. Geological Survey with assignments including Chief of the National Water-Quality Assessment Program, Chief Geologist of the Geology Division, Associate Director for Geology and as acting Director. Leahy joined the American Geosciences Institute in 2007 as its Executive Director, and continued work on programs like Earth Science Week, facilitating coverage of Federal-level geoscience legislation with the Geoscience Policy Program, monitoring the geoscience workforce. The recently launched Center for Geoscience and Society will continue to bridge gaps that exist between geoscientists, educators, policy makers and the general public. He also serves as a U.S. Commissioner to the United Nations Educational, Scientific, Cultural Organization (UNESCO).

Dr. Jonathan Arthur, Florida State Geologist, and President of AASG had this to say of Leahy, "[Leahy] is a friend and vital, dynamic part of the geoscience community, and he embodies its spirit. Awareness of geosciences in this nation has been heightened significantly through effective education and communication guided by his wisdom and instilled by his enthusiasm and creativity."

Recent recipients of Pick and Gavel awards include Congressman Ken Calvert in 2014, Congresswoman Betty McCollum in 2013, Senator Dianne Feinstein and Congressman Jim Moran in 2012. Leahy will be honored with a dinner at the Cosmos Club in Washington D.C. on the evening of Tuesday March, 10th, 2015.

## SME Executive Director receives prestigious MMSA Gold Medal award

**John Hayden**  
**Society for Mining and Metallurgy Exploration, Inc.**



**SME Executive Director David L. Kanagy.** Image Credit: SME

David L. Kanagy honored at MMSA Annual Dinner The Society for Mining, Metallurgy & Exploration Inc. (SME) is proud to announce that Executive Director David L. Kanagy was awarded the 2015 MMSA Gold Medal by the Mining and Metallurgical Society of America (MMSA) at their annual dinner on February 16, 2015 in Denver, CO.

The MMSA Gold Medal is awarded to individuals who have made significant contributions to the mining industry. Since its founding in 1908, MMSA has bestowed only 34 Gold Medal Awards. In presenting the 2015 award to Kanagy, MMSA Past President and Gold Medal Committee Chairman Mark K. Jorgensen noted that, as the new executive director of SME, Dave had spoken to



MMSA members in 2004 about his vision for the future of SME and the mining industry.

"Over the next 10 years, Dave was able to accomplish some remarkable things," stated Jorgensen. "He took ideas that were brought to him by people in this room and shared a vision about how to achieve them." Jorgensen continued by saying that the Gold Medal Committee has cited David for, "Outstanding leadership that has advanced the global collaboration of technical information, networking and professional development for mining professionals and enhanced public education about mining and minerals."

Mr. Jorgensen mentioned the value that SME provides to its members and stakeholders, and noted specifically:

- OneMine.org, the largest online digital mining research library in the world
- The Government and Public Affairs Committee which provides technical briefing papers to policy makers
- Establishment of the SME Congressional Fellowship program • Leadership of the World Federation of Engineering Organization's task force on Mining and Sustainability
- Collaboration with other organizations to form the Global Mineral Professionals Alliance
- Establishment of PhD Fellowship and Academic Career Development Grant programs
- Significantly downsized the SME Board of Directors

"I accept the MMSA Gold Medal with a sense of humbleness and gratitude to all those whom I have worked with during the past eleven years," said Kanagy in accepting the award. "Without the success that SME has had in recent years, we couldn't take on projects of the magnitude as stated by Mark Jorgensen. It is the volunteers and staff working together that has put all of this together; I just provided a little vision and leadership."

Kanagy has more than 30 years experience in the non-profit association industry and has been Executive Director of SME since 2004. During his tenure, SME has tripled revenues and increased global membership to more than 15,000. Through collaboration and cooperation with other organizations, as well as a strong connection to the institutes of higher learning which teach mining and metallurgy, SME continues to evolve to provide greater value for its members worldwide. The 2015 SME Conference drew 7,804 attendees, with 740

international members and 685 students. A total of 906 exhibit booths provided attendees with information and demonstrations of the latest trends and technologies.

## Oregon State Geologist Vicki McConnell Appointed Executive Director of Geological Society of America

Lee Allison

Association of American State Geologists



**GSA Executive Director  
Vickie S. McConnell. Image  
Credit: GSA.**

The Geological Society of America announced that Vicki S. McConnell will become its new Executive Director, effective 1 April 2015. Former GSA President Judy Totman Parrish will serve as Interim Executive Director from 3 January through 31 March 2015.

Vicki is presently the State Geologist of Oregon and Executive Director of the Department of Geology

and Mineral Industries, appointments by the Governor that she has held for the past decade. She was President of the Association of American State Geologists in 2011-2012. Under her direction, Oregon has been a leader in earthquake-risk reduction in schools and emergency facilities, tsunami-hazard mitigations and preparedness, and acquisition of LIDAR for applications in land-use planning, ecosystem restoration, and geologic and hazard mapping.

Vicki received her Ph.D. in geology/volcanology from the University of Alaska Fairbanks in 1995. She has also been a Research Associate at the University of Wisconsin-Madison and an Adjunct Professor of Geology at Eastern Oregon University. Her scholarly work has focused on understanding volcanic eruptive histories and their impact on magma-generated hydrothermal systems. She applies geologic field mapping and geochemical



research to volcanic hazards and renewable geothermal energy systems.

She is a GSA fellow, and was chair of the local planning committee for the 2009 GSA Annual Meeting in Portland. She is also a member of the American Geophysical Union, Association for Women Geoscientists, National Center for Science Education, Association of American State Geologists, and American Institute of Professional Geologists. She has served on numerous boards and councils, including the USGS Scientific Earthquake Studies Advisory Committee, and the Federal Advisory Committees for the National Cooperative Geology Map Program and the National Geological and Geophysical Data Preservation Program.

## New Report Identifies Possible Next Steps in U.S. Energy Development

**Dr. Maeve Boland**

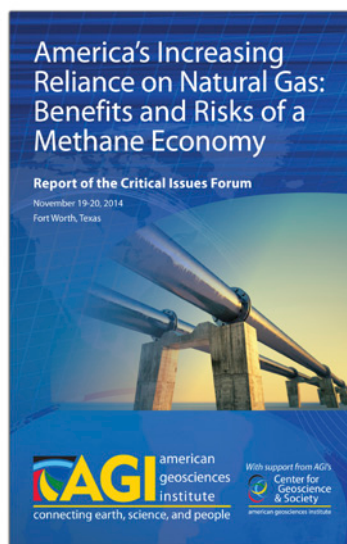
**American Geosciences Institute**

The U.S. energy portfolio changes over time. Scientific and technologic advances related to hydraulic fracturing have dramatically increased the supply of U.S. oil and gas; because of this, a methane economy – in which natural gas provides the leading share of primary energy consumption – is now a possible scenario for U.S. energy development. In a report released by the American Geosciences Institute (AGI), the social, political, technical and environmental components of a methane economy are identified. The report also addresses how industry, government and the public might best work together to advance common energy goals.

The report is based on the inaugural AGI Critical Issues Forum where experts were asked to consider whether a natural gas-dominant economy is achievable in North America and if such an economy would be desirable. In this forum, U.S. geoscientists, economists and environmental experts identified barriers and enablers to such an economy. They reviewed geological, infrastructural, technological, and financial factors that may affect future gas supplies and the demand for natural gas. The experts also considered the environmental, health, and safety factors that may have a significant effect on the development of natural gas.

One of the conclusions of the report is that social license granted by consensus public opinion – at the national, state and local levels – can be either a substantial enabler or barrier to a methane economy, and its importance cannot be overstated.

“In the U.S. we don’t really understand much about energy: where it comes from, the scale of demand or the benefits and challenges of producing different kinds of energy,” said Scott Tinker, Director of the Bureau of Economy Geology at the University of Texas at Austin, and State Geologist of Texas, “I don’t know where things will stand 50 years from now, but I do know that, like today, we are still going to be looking for sources that are affordable, accessible, reliable and sustainable. Those tenets will drive the energy mix, whatever it turns out to be.”



The inaugural Critical Issues Forum was hosted in Fort Worth, Texas in November 2014 by the American Geosciences Institute's Center for Geoscience and Society. The report is available for free download from the American Geosciences Institute website: <http://www.american-geosciences.org/policy/ci-forum-2014/final-report> or avail-

able for purchase from Amazon: <http://www.amazon.com/Americas-Increasing-Reliance-Natural-Gas/dp/1508843503/>.



## President's 2016 Budget Proposes \$1.2 Billion for the USGS

### Reflects robust Administration support for science-based decision-making in managing natural resources

Diane Noserale

U.S. Geological Survey

The President's fiscal year 2016 budget request for the U.S. Geological Survey is \$1.2 billion, an increase of nearly \$150 million above the FY 2015 enacted level. The FY16 budget reflects the vital role the USGS plays in advancing the President's ongoing commitment to scientific discovery and innovation to support a robust economy, sustainable economic growth, natural resource management, and science-based decision-making for critical societal needs.

The budget request includes increases that ensure the USGS is at the leading edge of earth sciences research. It includes robust funding for science to inform land and resource management decisions, advance a landscape-level understanding of ecosystems, and develop new information and strategies to support communities in responding to climate change, historic drought, water quality issues, and natural hazards. The budget also funds science to support the Nation's energy strategy, to help identify critical mineral resources, and to address the impacts of energy and mineral development on the environment.

"The USGS has a strong 136-year legacy of providing reliable science to decision-makers," said Suzette Kimball, Acting USGS Director. "This budget request recognizes our unique capabilities with multi-disciplinary earth science research and will allow the USGS to meet societal needs for our Nation now and in the future."

Key increases in the FY 2016 Budget are summarized below. For more detailed information on the President's 2016 budget, visit the USGS Budget, Planning, and Integration website.

### Meeting Water Challenges in the 21st Century

The FY16 budget provides an increase of \$14.5 million above the FY 2015 enacted level for science to support

sustainable water management. Meeting the Nation's water resource needs poses increasing challenges for resource managers, who must contend with changes in the frequency and magnitude of floods and droughts. As competition for water resources grows for activities such as farming, energy production, and community water supplies, so does the need for information and tools to aid decision-makers. The budget provides increased funding across several USGS mission areas to support resource managers in understanding and managing competing demands related to water availability and quality and to enable adaptive management of watersheds to support the resilience of the communities and ecosystems that depend on them. This includes a \$3.2 million increase for science to understand and respond to drought, a \$4 million increase for water use information and research, a \$2.5 million increase to study ecological water flows, a \$1.3 million increase for stream flow information, and a \$1.0 million increase to advance the National Groundwater Monitoring Network.

Powering Our Future and Supporting Sustainable Energy and Mineral Development

The 2016 USGS budget provides \$9.6 million in program increases across the energy, minerals and environmental health portfolio for science to support the sustainable development of unconventional oil and gas resources, renewable energy sources such as geothermal, wind, and solar, critical minerals such as rare earth elements, and to address the environmental impacts of uranium mining.

Specifically, the budget includes a program increase of \$1 million for mineral resources science to continue life-cycle analysis for critical minerals such as rare earth elements and to develop new science and tools to reduce the impacts of minerals extraction, production, and recycling on the global environment and human health. A life-cycle analysis will trace the flow of critical minerals from generation and occurrence through the consequences of human activity to ultimate disposition and disposal. The Nation faces key economic decisions within each stage of the resource life cycle. Scientific understanding is an essential input to these decisions. The program change will support new workforce capability to address the main thrusts of the President's four working groups in the Office of Science and Technology



Policy that are currently focused on critical and strategic materials essential to national security, economic vitality, and environmental protection.

## Responding to Natural Hazards

The budget provides an increase of more than \$6.6 million above the FY 2015 enacted level for natural hazard science. This includes an increase of \$4.9 million to expand the Global Seismic Network used for worldwide earthquake monitoring, tsunami warning, and nuclear treaty verification monitoring and research in partnership with the Department of Energy and the Department of Defense. It also includes a \$1.7 million increase to support space weather (solar flare) geomagnetic monitoring. The increase will also support the installation and operation of rapid-deployable streamgages and expand the library of flood-inundation maps to help manage flood response activities. The proposed increase will also support landslide, wildfire, and sinkhole response capabilities as well as provide disaster scenario planning products for emergency managers. Included in the request is funding to build on investments to continue development of an earthquake early warning system, with the goal of implementing a limited public warning system for the U.S. west coast by 2018, as well as continued investments in volcano monitoring networks and science.

## Building a Landscape-Level Understanding of Our Resources

The budget includes \$15.6 million to expand, enhance, and initiate ecosystem science activities to increase the understanding of the Nation's landscapes and how they work. This includes budget increases of \$6.7 million in support of critical landscapes. Specifically it provides a \$4.2 million increase for the Arctic, a \$1 million increase to study sagebrush landscapes that provide habitat for survival of greater sage-grouse, and a \$1.5 million increase that supports science for Puget Sound, Columbia River, and the upper Mississippi River. USGS research will continue to support restoration of other priority ecosystems, such as Chesapeake Bay, Everglades, Great Lakes, California Bay Delta, and the Gulf Coast. The budget request also provides an increase of \$2.2 million for research on invasive plants and animals

that cause significant economic losses in the U.S. and transmit diseases to wildlife and people, and \$1.6 million to study the decline of insects, birds, and mammals that pollinate agricultural and other plants. Finally, the budget increases funding by \$5.1 million to support coastal resilience to hazards and adaptation to long-term change from sea-level rise and coastal erosion.

## Foundations for Land Management

The President's budget request includes an increase of \$37.8 million to provide data and tools to help land and resource managers make informed decisions across the landscape and provide data and information to the public for use in a wide variety of applications. The budgets of USGS and NASA provide complementary funding to sustain the Landsat data stream, which is critical to understanding global landscapes. An increase of \$24.3 million in the USGS budget supports the ground system portion of the Sustained Land Imaging Program, including funding for ground systems development for a Thermal Instrument Free Flyer, Landsat 9 (a rebuild of Landsat 8), and to receive data from internal partners. The increase also will enhance the accessibility and usability of data. Specifically, the budget includes a \$4 million increase for Landsat science products for climate and resource assessments.

The budget provides increases for other foundational data and tools needed to support landscape-level understanding. For example, an increase of \$3.7 million will expand three-dimensional elevation data collection using ifsar (interferometric synthetic aperture radar) for Alaska and lidar (light detection and ranging) elsewhere in the U.S. in response to growing needs for high-quality, high-resolution elevation data to improve aviation safety, to understand and mitigate the effects of coastal erosion, storms, and other hazards, and to support many other critical activities. A \$1.8 million increase will enhance understanding of the benefits of the Nation's ecosystem services, and a \$1.1 million increase for the Big Earth Data Initiative will make high-value data sets easier to discover, access and use. The accessibility and usability of these data are critical for land management, hazard mitigation, and building a landscape-level understanding of our resources.

## Supporting Community Resilience in the Face of a Changing Climate

The USGS plays an important role in conducting research and developing information and tools to support communities in understanding, preparing for, and responding to the impacts of global change. The budget includes an increase of \$32 million above the FY 2015 enacted level for science to support climate resilience and adaptation. Climate change requires the Nation to prepare for more intense drought, heatwaves, wildfire, flooding, and sea level rise. These challenges are already impacting infrastructure, food and water supplies, and physical safety in communities across the Nation. Understanding potential impacts to communities, ecosystems, water, plant and animal species, and other resources is crucial to federal, state, tribal, local, and international partners as they develop adaptive and resilient strategies in response to climate change. The budget includes a \$6.8 million increase in science for adaptation and resilience planning, an increase of \$2.3 million for the USGS to provide interagency coordination of regional climate science activities across the Nation, an increase of \$8.7 million to support biological carbon sequestration, and an increase of \$11 million for the USGS to support the community resilience toolkit, which is a web-based clearinghouse of data, tools, shared applications, and best practices for resource managers, decision-makers, and the public.

## International Year of Soils Aims to Raise Soil's Profile

Kaine Korzekwa  
Soil Science Society of America



Image Credit: SSSA

Soil—it's what's under our feet. But it's also what makes sure there is food and water in our stomachs, air in our lungs, clothes on our backs, and a roof over our heads. Soil keeps us from being hungry, thirsty, breathless, naked, and homeless.

Besides just growing crops, soil is vital to securing many of the resources that hold the world together. Soil filters water, contains antibiotic-producing bacteria, and provides a stable platform on which to build homes and businesses, to name just a few ways soils are vital to life.

However, most people don't know or understand these unique and plentiful benefits of soils, and soil scientists like David Lindbo have been trying for years to figure out why. He says that without an understanding of the importance of soils, the world's swiftly increasing population will be at risk as food and water supplies are strained.

"There is nothing that we touch that can't be somehow related back to the soil, so it's critical to take care of it," says Lindbo, a soil science professor at North Carolina State University. "Unfortunately most people don't think of it, especially in the developing world. Soils support the plants that give us oxygen, and soils filter our water. Soils are like the kidneys and lungs of the earth."

Soil scientists all around the world are joining forces to educate the public about the importance of healthy soils. Their efforts have culminated in 2015 being named the International Year of Soils by the United Nations (UN).



The International Year of Soils will be spearheaded by the Global Soils Partnership of the UN's Food and Agriculture Organization (FAO), which will be partnering with groups like The Soil Science Society of America (SSSA) and others around the world to raise awareness and promote the sustainability of our limited soil resources.

By pairing each month of 2015 with a different theme, each complete with its own educational and outreach activities, SSSA will give its members ways to interact with and educate the public.

## Reconnecting People to Soils

SSSA is hoping to restore people's connection to the soils. Lindbo says he has conducted workshops where he asks people to name four things in the world they can't live without. The answers always include sunlight, air and water but always leave out soils, he says.

"I ask kids where their food comes from, and they say the supermarket. We've lost that feel, that direct connection, to the soil. We haven't done a good job of promoting its importance like we have with clean water and clean air. There is no Clean Soils Act."

Soil scientists agree there are very interesting things about soil that many people aren't aware of, and promoting those reasons is important to soil scientists like Nick Comerford, a soil and water sciences professor at the University of Florida.

"I don't think a lot of people think about soils because they're always looking up and soil is down," Comerford says. "They don't know about the diversity, the soil's connection to the landscape or how the soil forms. We say that soils sustain life and to a large degree that's true, and we want to make sure people know that."

## Staggering Diversity

That diversity is a big reason the soil is able to do so much for the planet. Soil includes not just roots that support the plants above but also a myriad of different organisms, both invertebrate and vertebrate: everything from mammals to reptiles to insects to microorganisms.

A great place to start talking about diversity and its importance is from the top. A reptile called the gopher tortoise makes burrows in the ground, and "while this activity seems inconspicuous, the burrows actually serve as habitat for hundreds of other organisms, like

frogs and snakes, sometimes even at the same time," Comerford notes.



**Gopher tortoises make burrows in the ground, creating habitat for hundreds of other organisms. Image Credit: Flickr/FWC Fish and Wildlife Research Institute.**

Because these tortoises are in danger from habitat degradation, it also means that all of the animals they create a shelter for are also in danger. This is merely one example of the vast connectedness of the soil. Many species benefit from one another—that is until one becomes endangered.

When microorganisms enter the mix, there can be anywhere from 10,000 to 50,000 different species in a single gram of soil, amounting to 100 million to 3 billion individual microorganisms.

"The diversity is just staggering," Comerford says. "People just think about biodiversity above ground, but that is only a footnote to the amount of diversity that we find below ground."

Mary Stromberger, a soil microbiologist at Colorado State University, says this breadth of diversity is very hard for people to imagine. She stresses that soils are indeed living, diverse, and complex.

"I mean when you talk about a handful of soil containing more species of bacteria than there are plant species in the entire world, it's really hard for people to grasp the relevance of that," she says. "You start to do comparisons, and people are like 'wow that's pretty amazing' but then the problem is trying to explain why that diversity is important."

She adds that soil scientists have a tough job to do when advocating for the importance of soil diversity because most of the soil organisms are invisible or



**Scanning electron micrograph of an adult water bear (tardigrade), *Hypsibius dujardini*. Image Credit: Bob Goldstein & Vicky Madden, UNC Chapel Hill, and Flickr Commons.**

not charismatic animals like pandas. It's important to find relatable organisms and their direct links to soils, she points out. Earthworms are one example and so are water bears, tiny soil microorganisms that actually resemble bears when viewed microscopically.

Many of these microorganisms are beneficial to humans in numerous ways. One area they heavily impact is health. In 1943, Selman Waksman and his graduate student Albert Schatz discovered the soil-based antibiotic streptomycin, which was the first cure for tuberculosis.

The antibiotic is synthesized by a kind of soil bacteria to kill off its competitors. The scientists were able to isolate the compound to use it in human medicine. Waksman received the Nobel Prize in Physiology/Medicine in 1952, and streptomycin is on the World Health Organization's List of Essential Medicines. More modern research has found a drug that has anti-depressant properties and another which appears to have a role in fighting cancer.

"Given the biodiversity and how little we know about that diversity, the potential for future utility coming from the soil just from a pharmaceutical aspect is quite large," Comerford says. "And we only know about the tiniest fraction of this diversity, something like just 1 or 2%. It's mind-blowing."

Stromberger's work focuses on another benefit of soil microorganisms, which is their interaction with plants. She has found a group of bacteria that live on the roots of wheat and affect the level of hormones in the plants, which allows the plant to more be drought tolerant. She explains that the plant actually releases a chemical to recruit certain kinds of bacteria. The bacteria then move through the soil and colonize the root.

The work is exciting because drought tolerance can lead to better crop yields, and this group of bacteria and drought tolerance are only one example of

microbe-plant interactions. For example, there is also research into microbes giving plants tolerance to higher levels of salinity.

"I think this is all just amazing," Stromberger says. "It's a really exciting area to be in right now because we are learning so much about soil microbes. There are so many discoveries to be made in terms of networks of roots, bacteria, and fungi that I tell my classes to compare soil to the movie *Avatar* because everything is really connected."

## Structural Support and Filtering Properties

Lindbo, at North Carolina State, likes to add to the long list of things that make soils amazing. Two things he enjoys talking about are the structural support and filtering properties of soil.

"You have to understand how much weight the soil can take, called its bearing capacity," he explains. "It's a great example of soil science and civil engineering working together. You can't put a building on a soil that you don't understand and don't know what its bearing capacity is. The prime example is the Leaning Tower of Pisa. There's a great comic of that structure with someone saying 'they should have talked to a soil scientist.'"

Lindbo's research involves soils' role in septic systems, wastewater dispersal, and treatment. He says it's an example of using the physical, biological, and chemical aspects of soils to properly treat water and then disperse it back into the environment, particularly in rural areas.

Twenty-five percent of the country uses a septic system to treat their wastewater. Those individuals take water out of the well, drink it, and put it back. "This water is safe because the soil does an absolutely fantastic job of treating wastewater, and it can be taken for granted," he says.

He adds that studying soil is important because not all soils are created equal. In some areas, the soil may be enough to sufficiently filter water, but in others, the soil may need a helping hand. It all depends on the density of the population and the type of wastewater.

## Soils and Culture

Beyond the inherent physical ways that soils serve the world, the soil scientists also like to point out soil's transcendence into culture. They point to how soil





**Understanding the bearing capacity of the soil is critical for successful construction projects. Image Credit: Forest Starr and Kim Starr and Flickr Commons..**

grounds the world in a “sense of place.” Native American culture has long shown a connection to soil through written and spoken works of art, and soil was even alluded to by Abraham Lincoln in the Gettysburg Address in 1863.

SSSA hopes to use the International Year of Soils to broaden people’s knowledge about these unique ways that soils serve the world. A goal is to get people to ask questions and think critically about what soils do for them, forging a connection between the soils and what people do, eat, and wear.

Lindbo says he would love the outreach to go beyond just individuals. He would like to see different forms of media, such as National Geographic and NOVA, begin to cover soils more heavily in print and multimedia.



**Much of our cultural heritage is preserved by soils, to be uncovered by later generations. Image Credit: David Robinson.**

“If we could meet all of these goals that would be wonderful,” he says. “Granted, that is a tall order, but we’ve got to dream. If we don’t try for it, it will not happen. We want to push members to get engaged. Get out there anytime you have an opportunity to speak to the public, K-12 students, public officials, or at rotary meetings, and other public events. Don’t be shy about it.”

The hope is that events in 2015 will create a pipeline of soil awareness between organizations like the UN FAO, soil scientists across the world, and the public—all of whom are served endlessly by soil every day.

“Soils have an effect on pretty much every aspect of our lives, and we are hoping the International Year of Soils can help more people realize that,” Lindbo says. “The main thing is we want people to get out there and get dirty.”

This story originally appeared in the Jan.-Feb 2015 issue of Soil Horizons.

## Earth Science Week 2015 Theme Announced: “Visualizing Earth Systems”

**Geoff Camphire**

**American Geosciences Institute**

The American Geosciences Institute (AGI) is pleased to announce that the theme of Earth Science Week 2015 will be “Visualizing Earth Systems.” This year’s event will promote awareness of the many ways scientists monitor and represent information about Earth systems including land, water, air, and living things.

Earth Science Week 2015 learning resources and activities will engage young people and others in exploring ways of visualizing Earth systems. Using technologies ranging from on-site data collection to satellite-based remote sensing, scientists investigate conditions of Earth systems. And today’s geoscientists display their findings in charts, graphs, diagrams, illustrations, photos, videos, computer-generated animations, and 3D-printed creations.

“With this theme, Earth Science Week explores what it means to see our planet through eyes informed by the geosciences,” says Geoff Camphire, AGI’s Manager of Outreach. “Geoscientists are finding innovative ways to not only examine natural phenomena, but also present

that information to professional, educational, and other audiences. In addition to tools such as telescopes and microscopes, we also can view and map changes in natural systems through new avenues such as computer games, smartphone apps, and online videos.”

Reaching over 50 million people annually, AGI leads Earth Science Week in cooperation with its sponsors and the geoscience community as a service to the public. Each year, community groups, educators, and interested citizens organize celebratory events. Earth Science Week offers opportunities to discover the Earth sciences and engage in responsible stewardship of the Earth.

Earth Science Week is supported by many organizations, including the U.S. Geological Survey; the AAPG Foundation; the National Park Service; NASA; Esri; National Geographic; the Society for Mining, Metallurgy and Exploration; the Geological Society of America; and the American Geophysical Union; the Association of American State Geologists; and the Archeological Institute of America.

## NESTA Seeks Executive Director

The National Earth Science Teachers Association (NESTA) is seeking a qualified person to serve as the Association's Executive Director. NESTA is a professional association open to any person with an interest in Earth Science education. Most NESTA programs are designed to serve the K–12 levels where the majority of our membership lies. NESTA cooperates with other professional education associations, scientific societies, and federal agencies to promote Earth Science education. Many NESTA activities take place at National Science Teachers Association (NSTA) conferences and at State science education meetings. The Executive Director must be able to attend NSTA National conferences, should attend NSTA Area conferences if possible, and be available to represent NESTA in other venues (GSA, AGU, etc.)

### Duties

The NESTA Executive Director shall:

- Work with the NESTA Board of Directors, especially the President and other Executive Committee Officers, to develop and carry out NESTA's short- and long-term

activities, including the goals of the NESTA Strategic Plan.

- Facilitate the work of the NESTA Conference and Professional Development Committees, who have the responsibilities to organize and coordinate NESTA events at National and Area Conferences and in other venues. These may include: workshop and share-a-thon sessions, rock raffle, NESTA 'trading post', field trips, AGU Lecture and other events, Board of Directors and annual membership meetings, and the Friends of Earth Science Reception.
- Assist The Earth Scientist Editors, E-News Editor, Website Membership Coordinator, Facebook manager, and other Coordinators and Program Managers to ensure continuity and quality of these programs.
- Communicate with other professional organizations such as the American Geophysical Union (AGU), American Geoscience Institute (AGI), Geological Society of America (GSA), American Meteorological Society (AMS), Howard Hughes Medical Institute (HHMI), National Association of Geoscience Teachers (NAGT); federal agencies such as NASA, NOAA, and USGS; and other potential partnerships, such as ESIP, to support NESTA's programs.
- Coordinate with the Board of Directors and NESTA staff to ensure efficient functioning of NESTA office responsibilities, membership, reporting, grant development, and other duties. Strong grant writing and management skills are essential.
- Continue to advance NESTA's processes and programs toward increasing efficiency, sustainable funding for NESTA's programs, increasing membership, and implementation of best practices for non-profit organizations.
- Bring knowledge and informed vision based on experience and emerging trends in Science Education to the benefit of NESTA, helping to continue to move NESTA forward.



- Perform any other pertinent activities as developed and mutually agreed with the Board of Directors.

## Qualifications

The NESTA Executive Director should have the vision, tenacity, creativity, and excellent people skills needed to offer sound advice about the programmatic and management needs of a national Earth Science educational professional association. The NESTA Executive Director needs to be a person who has a background in both education and the geosciences, and should have a history of meaningful involvement working with/or within NESTA and related organizations.

The NESTA Executive Director reports to the Board of Directors and must work effectively and cooperatively with the NESTA Leadership. Elected NESTA officers serve two-year terms, but for continuity sake, the NESTA Executive Director needs to commit to serving a minimum of 3 years, with additional terms possible as mutually agreed upon by the Executive Director and the Board of Directors.

NESTA is a member-based organization supported by membership dues, revenue from NESTA-sponsored activities, donations, sponsorships and grants. NESTA does not have the resources to offer a salary, full travel expenses, or extensive office support. The person applying for this position should be able to make serving NESTA part of the educational outreach for their academic institution, governmental agency, professional organization, or volunteer program with which she/her is associated. 4. Experience directing staff and managing consultants is essential, as well as an understanding of non-profit organization development and maintenance, including legal, tax, and ethical considerations.

If you are interested in this position, please send a letter of intent and brief vita by 31 May to the "Executive Director Search Committee" via Michael J. Passow [mjpassow@gmail.com](mailto:mjpassow@gmail.com).

The effective start date for this position will be 1 July 2015.

## Discovery of Prudhoe Bay 'Marshall's Folly' Changes Course of Alaska History

Heather Saucier, EXPLORER Correspondent  
American Association of Petroleum Geologists

### It wasn't easy, that's for sure.



**AAPG Member Tom Marshall. Image Credit AAPG.**

But AAPG member Tom Marshall – a geologist who moved to Alaska in his early 30s, enamored by the idea of homesteading in the Matanuska-Susitna Valley – managed to change the future of the entire state with a suggestion that sounded as promising as a dry hole.

Marshall's homesteading, which he funded by random consulting jobs for investors in minerals and petroleum, led him down a path that culminated in a series of discussions with the Alaska governor and ultimately opened the door to the Prudhoe Bay discovery.

It all took place in the late 1950s and early '60s, against a backdrop of tremendous controversy. The public at large, the oil and gas industry and the newly formed state government put Marshall's theory about a large oil field on the North Slope farther left than left field.

Voicing a common belief at the time that oil could not be produced from icy ground, the late Gov. William Egan once asked, "Don't you know the North Slope is frozen?"

### So Wrong, So Right

Hired on the spot as an assistant land selection officer in 1960, Marshall's experience in geology piqued the interest of the director of the newly created Division of Lands in the Department of Natural Resources after Alaska became a state in 1959. Marshall was tasked with making recommendations for the selection of state lands that the federal government would deed to Alaska under the 1958 Statehood Act.

The Division of Lands was permitted to select 102 million acres over a 25-year period of time, and it focused on multi-purpose acreage that would bring the state revenue via the timber industry, parks and recreation,

agriculture, and oil and gas activity – particularly in Cook Inlet.

Marshall's idea to select 1.59 million coastal acres on the North Slope – believing that oil might lay beneath the Barrow Arch – drew laughs and even disdain, as little was known about North Slope geology at the time.

On Marshall's application to the Bureau of Land Management requesting acreage that included Prudhoe Bay, a colleague had written "Marshall's Folly," and it was buried at the bottom of the stack.

"I wish I had pulled that sheet out and kept it as a souvenir," said Marshall, now 89 and living in Anchorage. "No one wanted to believe it could be a huge oil field. Maybe it was too good to be true. I don't know."

But Marshall stuck to his guns.

If he was wrong, Alaska would own useless land that yielded no revenue. The state would have spent roughly \$40,000 in federal filing fees for naught and significantly reduced its federal funding for infrastructure and fire protection, explained Herb Lang, a retired lands officer for the Division of Lands.

However, if Marshall was right ...

## Discovery of the Century

In 1968, the Prudhoe Bay State No. 1 well, drilled by Atlantic Richfield Company (Arco) and Humble Oil (now ExxonMobil), tapped into the largest oil field in North America. The well was located on state lands officially selected by Marshall and leased to Richfield Oil and Humble in a 1965 auction.

A confidential report confirming oil at Prudhoe Bay slid across Marshall's desk before the news hit the public. Working as the state geologist for Alaska's Division of Mines and Minerals at the time, Marshall read the report before walking outside to his next appointment.

"I'll never forget that day," he said. "I was walking toward the Westward Hotel in Anchorage. It was a seven-story building, and I thought, 'Holy Moses! That pay section is as thick as this hotel is tall.'"

The discovery made headlines around the world. Its success drew countless explorers to the North Slope in the late 1960s and '70s – all paying millions to lease state lands in search of another Prudhoe Bay.

Initially estimated to contain 25 billion barrels of oil in place, Prudhoe Bay has produced an excess of 13 billion

barrels to date and brought billions of dollars in revenue to Alaska – transforming it from a poor mining state into an oil and gas Mecca of sorts. The state's Permanent Fund, established by its constitution and worth \$52 billion today, pays yearly dividends to all Alaska residents.

"It has long seemed to me that every time an Alaskan resident cashes or deposits a Permanent Fund dividend check, he or she should stop for just a moment and say a short word of thanks to Tom Marshall," said Gil Mull, an AAPG member who mapped extensively on the North Slope for Richfield and Humble and served as a wellsite geologist when the Prudhoe Bay State No. 1 well struck oil.

"Of course, the Permanent Fund is just a fraction of the other state services that have been paid for over the years by revenue the state has received as a result of Tom's foresight," added Mull, who also worked for the Alaska Division of Geological and Geophysical Surveys, Division of Oil and Gas, and the U.S. Geological Survey.

"The problem has been that only a few have ever heard his name."

## Common Name, Uncommon Man

"Tom Marshall" may be a common name, but the Tom Marshall who was born in Nebraska, went to college in Colorado, accepted his first geology job in Wyoming and then headed to the 49th state is no common man.

While working in Casper, Wyo., Marshall crossed paths with AAPG member John Wold, a well-known geologist and businessman (and AAPG Pioneer Award winner) who opened up coal exploration in the Powder River Basin in the 1950s. Wold hired a young Marshall to evaluate properties he owned in the Lower 48 for uranium potential.

Marshall often talked of a mysterious Alaska. He shared stories about the U.S. territory told by his grandfather, who worked as a mounted policeman in Canada and often crossed the border to take in Alaska's majestic landscape. Marshall wanted to see the land for himself, and Wold hired him on a retainer to scope properties with investment potential.

Aware of the U.S. Navy's efforts to find oil reserves on the North Slope with assistance from the USGS, Marshall studied "the dickens" out of the USGS's reports, accumulating a library of papers and maps.



Running out of money as a homesteader, Marshall applied for a job at the state's Department of Natural Resources and was hired by the director, Roscoe Bell, to help select lands that might enable the nascent state to support itself.

## Arctic Wasteland

While other land selection officers worked to identify tracts suitable for agriculture, the timber trade and other means of revenue, Marshall put his petroleum geology background to use. He was the first to suggest land for single-use purposes, and the first to suggest land on what many had dubbed the "Arctic Wasteland."

The state polled the oil and gas industry, and the six operators exploring in Alaska at the time all expressed interest in leasing land much farther south of the North Slope – on the same latitudinal line as the small, non-commercial discoveries made by the Navy near Umiat in the National Petroleum Reserve No. 4 (NPR-4).

Although the conservative way to explore was near known accumulations, Marshall insisted that to bring oil to market, a huge field would be needed to pay for a very long pipeline to tidewater.

The "little wrinkles" in Cretaceous rocks in NPR-4 would not cut it. The large structural high Marshall studied near Prudhoe Bay had much better potential – and oil seeps near Cape Simpson added interest to his claim.

"I was very appreciative of the fact that the North Slope would be a place to commit financial suicide if you tried to develop small fields like Umiat," Marshall recalled. "Size meant everything."

While many may have regarded Marshall as a pariah – or perhaps a tad insane – his opinions caught the attention of the late Phil Holdsworth, a fellow homesteader and the first commissioner of the Department of Natural Resources.

Holdsworth was aware that Marshall was the first to use aerial photographs to piece together a map to evaluate mining properties in Alaska – particularly in the Cashe Creek area.

"I could show the difference in the gradients of that stream and where the gradient changed rapidly. That's where you could expect to find gold to accumulate," Marshall explained.

His map made many rounds through the geological community and eventually landed in front of Holdsworth.

## Whistling a Different Tune

Intrigued by Marshall's map and geological savvy, Holdsworth conferred with Bell of the Division of Lands and took a closer look at Marshall's recommendations for state land selection. Soon after, several meetings were held with the governor to sell Marshall's controversial idea.

"We did not have enough money in our budget to do what Tom recommended," Lang recalled, explaining that the new state had little means to pay for the federal filing fees for a land selection that large. "The governor was very cautious. It was a whole new game for us."

Using a plethora of maps and reports, Holdsworth and Bell translated Marshall's technical analysis into words that resonated with the governor, who then dug deep into the state's pockets to fund the selection – keeping his fingers crossed.

"We took chances in the early days," Lang said, "and sometimes we even won."

After the discovery at Prudhoe Bay, operators were bidding in the millions – hitting a record \$900 million in 1969 – for state leases on the North Slope.

"It was a shock to people that this oil and gas was really worth something," Marshall recalled. "Oil and gas just didn't have the stature that it has now. Alaska was a mining state."

## Lost in the Wrinkles of Time

As with many political successes, the governor received credit for the billions of dollars that flowed alongside the oil at Prudhoe Bay. Marshall has been honored from time to time for his insights, but he mostly remained out of the limelight for the remainder of his career – becoming state petroleum supervisor in 1965 before retiring in 1978.

After all this time, however, Marshall's contributions have again reached radar level.

In May, he will receive an honorary doctor of science degree from the University of Alaska Fairbanks, said Marmian Grimes, a spokeswoman for the university. He will be joined by his son, Charlie, at the commencement ceremony.

As rich in modesty as Prudhoe Bay is in oil, Marshall credits his success to simply being “in the right place at the right time with the right knowledge.”

Others see him quite differently.

“Many people in public service in Alaska have made important contributions that make Alaska what it is today,” Mull said. “But in my estimation, the decision that Tom Marshall made as an Alaska state employee stands at the top of the list as the single most important decision ever made by anyone in service to the state of Alaska.”

“It all started with Tom,” Lang added. “He is the man who came up with the idea.”

For Marshall, he’s simply glad that some people are willing to entertain seemingly outlandish ideas.

“If they aren’t going to be tested, then people are going to continue believing that these are just crazy, crazy, crazy ideas,” Marshall said.

Discovering Prudhoe Bay “blew everyone’s mind,” he said, “including mine.”

## Summary of the March 22, 2014 Oso Landslide, WA

**Jeffrey Keaton, Joseph Wartman, Scott Anderson,  
Jean Benoît, Don DeLaChapelle, Robert Gilbert, and  
David Montgomery  
Association of Environmental and Engineering  
Geologists**

### Introduction

The Oso Landslide (Figure 1) devastated a rural residential community in Snohomish County, near Oso, WA, at 10:37 a.m. on Saturday, March 22, 2014. Seasonal precipitation was not unusual for the region, however, the local area experienced three weeks of intense rainfall prior to the landslide. Initial landslide movement occurred in the lower part of a ~200-m-high valley slope above the North Fork Stillaguamish River in glacial, colluvial, and preexisting landslide deposits. The movement transitioned into a debris avalanche/debris flow that rapidly inundated the valley and destroyed a neighborhood of approximately 35 single family residences established in the 1960s. The lives of 43 people were lost, making it the deadliest landslide in the history of the continental United States. The landslide caused significant economic

losses, which officials have estimated to exceed US \$120 million. The volume of the landslide was approximately 8 million cubic meters. The hillslope at the 2014 landslide location was at a cut bank of the North Fork Stillaguamish River with a documented history of sliding since the 1950s. The most recent prior slide, known as the “Hazel Landslide,” occurred in January 2006, blocking the river and flooding a few of the properties that subsequently were destroyed by the 2014 Oso Landslide.

This article is based on the findings of the Geotechnical Extreme Events Reconnaissance (GEER) Association scientific research team, which performed a field reconnaissance of the Oso Landslide in May 2014, shortly after the main rescue and recovery efforts were completed. The GEER Association is sponsored by the National Science Foundation; the goals of GEER field reconnaissance efforts are to document geotechnical conditions at selected event locations and to collect field data that are likely to be lost over time. GEER investigations are not intended to be final, conclusive studies; instead, they are preliminary assessments based on reconnaissance observations made shortly following selected events with geotechnical effects, as well as other available data. Complete details of the Oso Landslide investigation are available online (GEER, 2014).

### Geography, Vegetation, and Geology

The Oso Landslide occurred in the west-trending North Fork Stillaguamish River Valley, which is in the northern Cascade Range physiographic province approximately 40 km east of the Puget Sound and 80 km northeast of Seattle. Conditions in the region are dominated by major valleys and surrounding mountains with ridges and glacially sculpted peaks that exceed 2000 m elevation. The area in the immediate vicinity of the Oso Landslide is dominated by fluvial valley bottoms and prominent upland benches with strip-like zones of steep valley-wall slopes. Geologic materials deposited by glaciers or pro-glacial streams, or in glacier-dammed lakes, have been incised by the North Fork Stillaguamish River. The meandering river erodes the toes of valley-wall slopes, producing landslides at each instance and an overall scalloped shape of the valley sides. The upland bench adjacent to the Oso Landslide is Whitman Bench, a





Image Credit: AEG

The native forest surrounding the Oso Landslide consisted of dense old-growth stands of Douglas fir,

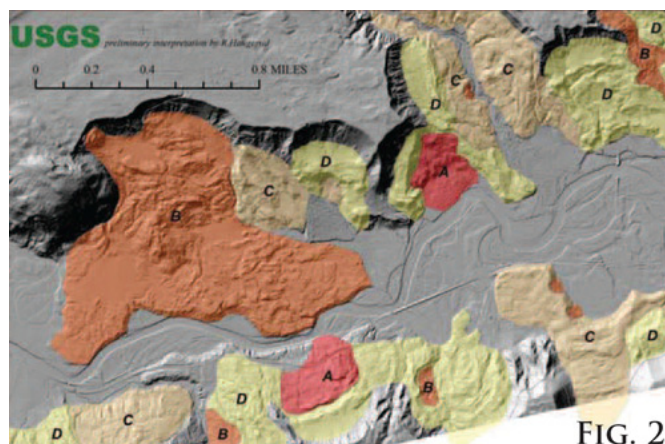


Image Credit: AEG

western hemlock, and true fir. The earliest available aerial photographs of the slide location are from 1933 and show evidence of contemporary logging activity on Whitman Bench to the west and on the lower valley slope near the Oso Landslide location. Extensive timber harvesting occurred around 1960 on slopes in the Oso Landslide area (Miller and Sias, 1997).

Dragovich et al. (2003) mapped the Oso Landslide area as part of an extensive landslide complex that has local exposures of in-place Olympia non-glacial sediments (fluvial sands), overlain by Vashon stade advance lacustrine deposits and till, with Everson interstage recessional lacustrine and outwash deposits forming the top of the section underlying Whitman Bench. Postglacial river incision impinged upon the valley walls, producing landslides large enough to shift the river across the valley, where it impinged and destabilize the opposite valley wall. Back-and-forth river shifts during the Holocene likely contributed to valley widening and the modern valley floor morphology.

The groundwater setting of the Oso Landslide is poorly known. Glacial till is overlain by recessional outwash sand and gravel and underlain by advance outwash and glacial-lacustrine deposits. The outwash deposits are highly permeable, whereas the glacial till and glacial-lacustrine silt and clay formations are of much lower permeability. These permeability differences create the potential for an unconfined aquifer perched on the glacial till and for a confined aquifer between the till and glacial-lacustrine deposits. Local seeps along the recessional outwash/till contact were observed during the GEER reconnaissance. The advance outwash and glacial-lacustrine deposits were overridden by the



Cordilleran Ice Sheet, which had a maximum thickness on the order of 1 km (Haugerud, 2014a). Cohesive materials compacted by ice probably developed fissures in response to stress relief as the glacier receded and have fissure-dominated hydraulic conductivity.

## Climate and Precipitation

Monthly normal and actual precipitation rates for weather stations closest to the landslide were reviewed with particular emphasis on fall (September to December) 2013 and winter (January to March) 2014 precipitation. It was found that September 2013 was wetter than the 1981 to 2010 (30-yr) monthly normal precipitation, whereas October, November, and December 2013 were dryer than normal. January and February 2014 precipitation was approximately normal. Precipitation at the nearby Darrington Ranger Station was higher in March 2014 than it has been in any other month during the 63-yr period of record for that gauge, but other gauges in the region showed less extreme March precipitation.

Cao et al. (2014) analyzed the return periods of precipitation accumulation preceding March 22, 2014, based on the gauge at the Darrington Ranger Station. The return period for cumulative precipitation for 21 days ending on March 22, 2014, is ~97 years, making the first three weeks of March in 2014 the wettest early to mid-March on record at the Darrington Ranger Station. Preliminary evaluation of NEXRAD Doppler radar data for March 2014 indicated that precipitation across the region was variable. Despite the heavy precipitation during the three weeks prior to the Oso Landslide, it was the only major landslide that occurred in the late winter or spring of 2014 in Snohomish County or adjacent counties.

## Oso Landslide Background

Lidar-derived shaded relief images of the North Fork Stillaguamish River valley show striking evidence of multiple generations of large landslides in the vicinity of the 2014 Oso Landslide. Haugerud (2014b) mapped at least 15 large landslides in four relative age classes (Figure 2) in the immediate vicinity of the Oso Landslide. This mapping includes a large slide located immediately to the west of the Oso Landslide that ran out across the valley bottom, leaving an appearance strikingly similar to that of the 2014 Oso Landslide.

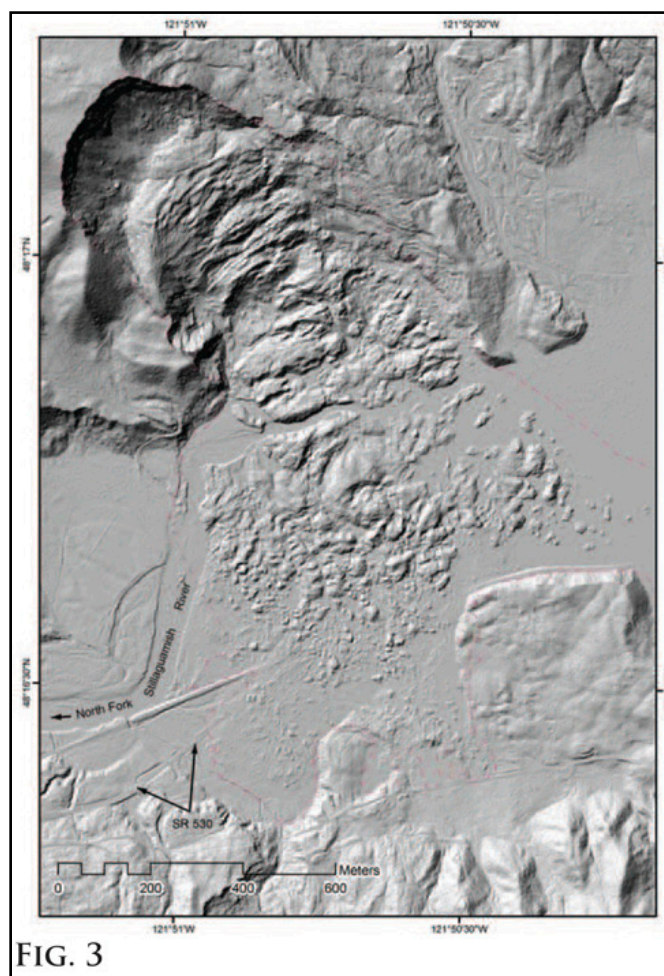


FIG. 3

Image Credit: AEG

Pre-event lidar topography (2003 and 2013) shows the steep main scarp of an ancient landslide defining the southeast margin of the Whitman Bench at the Oso Landslide site. It also shows the river displaced several hundred feet to the southeast by the 2006 Hazel Landslide. Elevation differences between the 2003 and 2013 lidar data shows a net decrease of as much as 30 m below the main scarp and net increase in the slide toe of as much as 17 m. Also evident is substantial lowering of the eastern margin of the active landslide relative to the elevation of the neighboring drainage basin, known as Headache Creek, to the northeast of the 2006 Hazel Landslide. The 2014 lidar data set shows the morphology of the Oso Landslide (Figure 3). Elevation differences between the 2013 and 2014 lidar data show a net decrease of as much as 88 m below the main scarp and a net increase of as much as 23 m on depositional mounds on the valley bottom.



The stratigraphy of the slope that generated the Oso Landslide is typical of Puget Lowland deposits. The oldest material exposed at the landslide site consists of limited exposures of oxidized fluvial sands near river level that we interpret to be pre-glacial floodplain sediments of Olympia Age (last inter-glacial). These deposits are overlain by glacial-lacustrine deposits associated with the most recent (Vashon) glacial advance. The glacial-lacustrine deposits grade vertically upward into silty to sandy advance outwash deposits that are, in turn, overlain by Vashon-age glacial till. Above the till lie the uppermost exposures, consisting of recessional outwash deposits that form the topographic surface of the Whitman Bench. Prior to the 2014 Oso Landslide, the earth materials on the face of the ancient slide scarp and on the bench at the head of the ancient landslide upslope of the 2006 landslide likely were displaced and reworked blocks of recessional outwash, till, and colluvium. Earth materials located downslope within the 2006 landslide likely were a mix of these units, and underlain by in-place glacial-lacustrine deposits.

## Oso Landslide Zones

Based on the GEER reconnaissance observations and analysis of field data, we identified six zones and several subzones of the Oso Landslide that are characterized by distinctive geomorphic expression produced by styles of deformation, geologic materials, and transported vegetation (Figure 4). The zones are described from head to toe.

**Zone A — Main Scarp and Back-Rotated Block:** Zone A was subdivided into four sub-zones. Zone A1 consists of the landslide main scarp with in-place exposures of oxidized tan to brown recessional outwash and unoxidized gray glacial till. Active seepage was observed at the sharp contact between these two units. Zone A2 consists of a large, down-dropped and back-rotated block covered by mature, second-growth trees that have been felled in a uniform direction with their crowns pointing upslope. The surface of this block is recessional outwash and represents the original ground surface of the Whitman Bench; patches of the original forest floor are preserved relatively intact on the surface of the down-dropped block. Zone A3 consists of till fragments that came down along with and buttressed the downslope side of Zone

A2. The till along the eastern margin of Zone A3 travelled farther than other parts of Zone A3, creating a blocky debris field with relatively intact blocks of till, some >3 m high. Distal portions of this material lap onto Zone B. Zone A4 consists of a scarp-face failure in which till and overlying recessional outwash material collapsed and over-rode a portion of Zone A2.

**Zone B — Rotational Block Field:** Zone B is characterized by transverse ridges and depressions formed by extension and back-rotation of blocks of till and glacial-lacustrine materials. Field mapping across a number of these blocks shows a downslope pattern of repeating elements of the stratigraphic section in a manner indicating back rotation and extension. Aerial photographs taken by the Washington State Department of Transportation on March 24, 2014, two days following the Oso Landslide, document drag marks on upper back-rotated blocks created by trees rooted in lower blocks that indicate direction and amount of extension. Thin deposits of light brown sand were observed in Zone B (and in Zone E) to coat gray till and glacial-lacustrine deposits in a manner that appeared to be fluidized sand ejected onto the ground surface. Sand ejecta deposits appear to be similar to sand boils (observed Zones E and F) and likely produced by elevated water pressure and in sandy soils susceptible to liquefaction.

**Zone C — Debris Flows Along Lateral Margin:** Zone C extends along the eastern lateral margin of the Oso Landslide from the head down to a point that is past the position of the North Fork Stillaguamish River channel prior to the landslide. Much of Zone C consists of debris-flow deposits along the lateral margin of the slide that lap onto deposits in Zone A3 and Zone B. Backrotated and relatively flat-lying glacial-lacustrine deposits are exposed on the floor and in the lateral margin of Zone C. This lateral margin exposes glacial-lacustrine sediments that flowed and which contain rafted blocks of more intact clay. Several actively flowing seeps were observed along the eastern margin of upper part of Zone C. The eastern margin of the Oso Landslide is the drainage divide with the neighboring Headache Creek basin, suggesting that some groundwater was flowing from this basin into the Oso Landslide.

**Zone D — Sheared Glacial-Lacustrine Sediments:** Zone D consists of sheared dark gray glacial-lacustrine

deposits exposed in a blocky debris field that is bisected by the present course of the river. Hand auger borings and trenches into the surface of the material in Zone D revealed from 0.3 to 1.5 m of outwash sand overlying glacial-lacustrine deposits or, where glacial-lacustrine deposits were at the surface, glacial-lacustrine deposits to the limit of the auger (3.8 m). This supports the inference based on reconnaissance observations that the materials at and near the surface in this area are from the deepest part of the stratigraphic section exposed on the slope. Zone D deposits exposed in the sides of the newly incised North Fork Stillaguamish River channel are composed of disturbed glacial-lacustrine material that ranged from 0.1 to 3.0 m-sized semi-intact blocks of cohesive clayey silt to silty clay in a disturbed matrix of nonplastic silt that may indicate the spacing of stress-relief fractures in the ice-compacted deposits. The southern margin of Zone D laps onto Zone E, with gray glacial-lacustrine material resting on blocks of colluvial material and partially burying felled trees in Zone E.

**Zone E—Block Field:** Zone E consists of high standing blocks that diminish in size to the south. Oxidized and gravel, interpreted to represent colluvial material from the face of the ancient landslide scarp, cover most of the blocks in the northern portions of Zone E giving the blocks a rounded, mound-like appearance. The blocks in the southern portions of Zone E are predominately glacial-lacustrine material without transported vegetation or a veneer of colluvium. Both coniferous and deciduous trees were observed on Zone E. Mature conifers are restricted to the northern part of Zone E and have various orientations, with some remaining subvertical. Large, mature trees, with one >1.5 m in diameter, are present along the northern margin of the western portion of Zone E; many trees along the margin of Zone D are partially over-run and buried by Zone D material. Felled trees at one Zone E location near the southwestern point of Zone D have contrasting orientations that suggest a collision zone.

Relatively small deciduous trees are increasingly prevalent toward the middle and distal areas of Zone E where progressively smaller block sizes reflect disintegration of the original ground surface of the 2006 landslide. As in Zone B, sand ejecta deposits in Zone E were observed on compression ridges, rather than in low areas, where

they appear to represent ejection of fluidized sand from cracks as the mass was emplaced.

**Zone F—Debris Flow Runout:** Zone F consists of gray silty debris flow material, with isolated partially disintegrated blocks of other material (e.g., glacial-lacustrine clay and till) smaller in size than present in Zone E. Large areas of Zone F were thoroughly disturbed, reworked, excavated, or hauled away during search, rescue, and recovery operations. The distal debris-flow deposit included logs, construction debris, silt, sand, and small blocks of till and clay. Building debris and trees from the floodplain forest were concentrated at and piled up along the distal edge of the landslide deposit, which ran some distance uphill before flowing back downhill or coming to rest on the southern valley wall.

## Seismic Signals

The Oso Landslide generated ground vibrations that were recorded by several seismic stations in the region (Allstadt et al., 2014). These recordings indicate two distinct episodes of landsliding separated by a short period of relative quiescence (Figure 5). The first and second episodes of landsliding initiated at 10:37:22 a.m. and 10:41:53 a.m., respectively (local time). In the subsequent one-hour period, at least 10 low-amplitude seismic signals were recorded.

## Eyewitness Accounts

The Oso Landslide occurred on a Saturday morning when a majority of community residents were at home. Media accounts indicate that 58 people were situated within the inundation zone when the landslide occurred. Of these, 15 individuals survived the debris flow and were rescued. It was reported that 13 community residents were away from their homes at the time of the landslide. Several of the landslide survivors as well as other individuals who were present but located outside of the inundation zone provided observations and recollections of the event to the media. These eyewitness accounts vary depending on the individuals' location and vantage point. Common themes are:

1. Extraordinary noise and the sound of crashing and breaking from the debris flow
2. Rapid inundation by a high, fast-moving, and highly liquid debris flow mass; and

3. Soft, “quicksand-like” condition of the saturated debris flow deposits.

FIG. 5

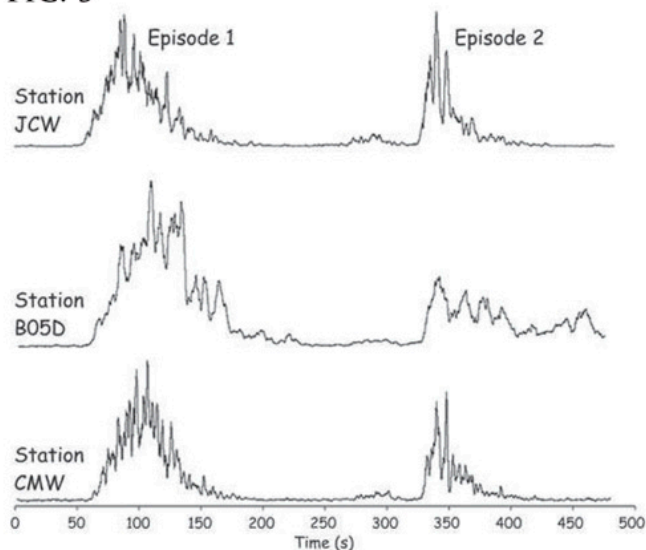


Image Credit: AEG

## Impacts on the Built Environment

The Oso Landslide completely destroyed the Steelhead Haven neighborhood and additionally damaged or destroyed many homes located along State Highway 530. Fragments of pavement and sections of guardrail from State Highway 530 were observed over a relatively small area in the eastern part of the southwest lobe south of the debris flow (Zone F). Most of the damaged or destroyed residential structures were removed or altered by the search, rescue, and recovery efforts; therefore, the GEER team was not able to make direct observations of building conditions after the landslide. Eyewitness reports and post-event photos and videos make clear that most structures failed quickly and catastrophically, most likely because of high velocity, significant debris-flow height, and amount of debris (most notably trees) entrained in the mass. Nearly all building debris was found within approximately 100 m of the distal edge of the debris flow deposit; such debris was carried across distances exceeding 200 m.

## Hypothesized Mechanisms of the March 22, 2014, Landslide

Field observations of superposition of landslide zone features support several stages of landsliding, whereas seismograph records indicate two main episodes of

landsliding separated by a few minutes. Our hypothesis of landslide mechanics is that the Oso Landslide occurred in two main stages (Figure 4): Stage 1: The first major stage of movement is interpreted to be remobilization of the 2006 slide mass and headward extension that included part of the forested slope of the ancient slide. Stage 1 was comprised of previous landslide deposits, some as recent as 2006, and could have engaged the lower portion of the ancient slide surface. As it initiated, or immediately thereafter, it mobilized as a debris flow traveling across the valley and causing essentially all of the destruction. Stage 1 could have involved two nearly coincident phases of failure, with initial mobilization of saturated 2006 slide debris that destabilized the ancient slide mass exposed in the steep 2006 main scarp. Collapse of ancient slide debris onto the saturated 2006 slide mass would have contributed to its transition into a debris flow.

After mobilization, it appears that the leading edge of Stage 1 became a turbulent flow because, not only did it travel a great distance and overwhelm the neighborhood south of the river, but little of its original ground surface was preserved as indicated in photographs taken by first-responders immediately following the disaster. The post-2006 slide slope had a dense deciduous tree forest, but little of the forest floor or trees from the forest are preserved on the surface of the 2014 deposit. Furthermore, intact blocks of glacial-lacustrine clay, till, or advance outwash near Zone E tend to be small, typically less than 1 m. In fact, the advance front of Stage 1 became so fluid that parts of the deposit appear to be hyper-concentrated flow rather than debris flow. Some of the margin appears to have been a water-borne log-front pushed ahead of the debris flow. Hyper-concentrated flow deposits were observed on pavement sections displaced from State Highway 530. The presence of mature trees (>1.5 m in diameter) in the large blocks of material in Zone E supports the interpretation that this material is from the ancient slide adjacent to the 2006 slide main scarp, and not from the recently logged Whitman Bench surface.

Past slides on the slope included debris flows and had dammed the river on several occasions, but no slides had mobilized with velocity and fluidity to travel across the valley. Many possible factors and hypotheses



could contribute to the marked difference in character between Stage 1 and Stage 2, and between Stage 1 and the 2006 landslide and earlier landslides, including:

- Three weeks of extreme rainfall preceding the event.
- Capture of groundwater from the Headache Creek basin.
- Post-2006 landslide topography had enhanced tendency to impounded water.
- Static liquefaction of the 2006 landslide mass.
- Dilation and strain softening on pre-existing shear surfaces in the glacial-lacustrine unit.
- Strength degradation toward residual values on pre-existing shear surfaces in the glacial-lacustrine deposits.
- Adverse effects of hydraulic conductivity variations within the glacial-lacustrine unit or within other stratigraphic units.
- Insufficient time for subsurface drainage and consolidation after the 2006 slide.
- The contribution of river and floodplain water in changing the character of a slide that was otherwise similar to the 2006 or earlier slides.
- Failure of ancient landslide debris onto the saturated 2006 landslide debris

**Stage 2:** The second stage probably occurred in response to Stage 1, creating an unsupported slope, and possibly to groundwater seepage forces. Stage 2 retrogressed into Whitman Bench by nearly 90 m horizontally from the ancient slide scarp. The Stage 2 slip surface probably joined the Stage 1 slip surface (also the 2006 and ancient slide slip surface) at depth, and included 300 m or more of deeper, previously in-place outwash, till and glacial-lacustrine deposits. The Stage 2 landslide mass moved rapidly on the existing Stage 1 slip surface until it impacted the more intact blocks at the trailing edge of the Stage 1 slide mass, where it came to rest. Evidence of impact includes broken and thrown trees (Figure 6) and ejected and splashed soils. These observations strongly support the two-stage slide mechanism, which is further supported by the seismic signals. Portions of the Stage 2 slide mass remained much more coherent than the Stage 1 mass, with the main block (Zone A2) remaining intact for the full 400 m width of the slide.

FIG. 6



Image Credit: AEG

## Acknowledgment

Financial support for this research was provided by the United States National Science Foundation under grant CMMI 1266418. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the National Science Foundation.

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## Enhancing Education and Academic Development

### International Association of Hydrogeologists

#### Background

Many of the core activities of a professional association are directed towards the education and academic development of its members, the broader groundwater community and the general public. For IAH, this has historically included our congresses, books and journal publications and the work of our commissions, together with events and activities of our national chapters. In recent years, however, we have become aware that more could be achieved to meet individuals' expectations, particularly given advancements in technology.

In response to the Forward Look, member surveys and comments raised from the trial of IAH's mentoring scheme, as well as the introduction of our new web platform, in 2013 a working group was set up to undertake a feasibility study of the options for provision of training courses and educational materials overall. The group (in alphabetical order) consisted of:

- Bruce Misstear, Ireland (Chair; IAH Executive)

- Daniel Nkhuwa, Zambia (African Groundwater Network)
- Suzanne Pierce (US National Chapter)
- Viviana Re, Italy (Early Career Hydrogeologists' Network)
- Andrew Stone, USA (Commission on Groundwater Outreach)
- Andrzej Witkowski (Polish Chapter)

The group's activities included a survey of on-line training resources and web-based educational materials, and seeking member's views via the newsletter and an on-line survey in April 2014.

#### Recommendations

A report on the group's work was presented to Council in Marrakech (September 2014), with recommendations which included the following:

- Creating a separate "Education and Training" banner on the IAH website home page, for easy identification
- Preparing a list of hydrogeology degree courses available around the world, with links to course information from the IAH website
- Listing short courses, field courses and webinars organised by national chapters
- Developing an IAH YouTube channel
- Linking with existing webinar providers to produce IAH-branded talks
- Compiling an international panel of experts willing to give their time to contribute to short courses organised by national chapters
- Preparing IAH-branded educational materials

- Developing a series of short thematic papers on key strategic topics to increase awareness of groundwater issues

Council warmly thanked the working group for its productive work and comprehensive report, and accepted the recommendations. The findings of the working group were also outlined to members at the Annual General Meeting in Marrakech and in the December 2014 edition of News and Information.

### Next Steps

Under the overall Forward Look Action Plan, a small budget was established which will be used over the next three years to take up and implement these recommendations. Each of the proposed products or resources will require careful attention and efforts to define target audiences.

Training and educational sessions are already taking place at IAH congresses organised by IAH's Early Career Hydrogeologist's Network (ECHN), as well as by IAH's topic based commissions and networks, and regionally via some of our National Chapters. You may have read reports from these in our newsletters and online. IAH will continue to encourage these and welcomes comments and suggestions.

After a period of "bedding in" for IAH's web platform, we are about to engage in further stages of development, with educational and professional development at the fore.

### Your help and support needed

IAH's plans are ambitious. Even with an active working group, these cannot be realised without the support and participation of our members and the groundwater community. If you have suggestions, or would be able to offer some of your time towards any of the recommendations listed above, please do get in touch.

### Contact us

[education@iah.org](mailto:education@iah.org)

## SSA Research Featured in New York Times Article

**Noach Dzmura**

**Sesimological Society of America**

A January article in the New York Times titled, "New Research Links Scores of Earthquakes to Fracking Wells Near a Fault in Ohio," was based on study results published in The Bulletin of the Seismological Society of America (Volume 105:1, January 2015). [[http://www.nytimes.com/2015/01/08/us/new-research-links-scores-of-earthquakes-to-fracking-wells-near-a-fault-in-ohio.html?hp&action=click&pgtype=Homepage&module=first-column-region&region=top-news&WT.nav=top-news&\\_r=3](http://www.nytimes.com/2015/01/08/us/new-research-links-scores-of-earthquakes-to-fracking-wells-near-a-fault-in-ohio.html?hp&action=click&pgtype=Homepage&module=first-column-region&region=top-news&WT.nav=top-news&_r=3)] The article is available for download. <http://www.bssaonline.org/content/105/1/189.full>.

## SME Photo Contest Winners



**1st Place 2014 SME Photo Contest: Ward Thurman**  
Borealis Mine Sunset, Heap Leach Operation, near Hawthorne, NV, October, 2013

**John Hayden**

**Society for Mining and Metallurgy Exploration, Inc.**

SME would like to thank everyone who submitted their images in this year's contest. We had some great entries and look forward to seeing the images at our upcoming SME Annual Conference & Expo at the Exhibit Hall entrance. Be sure to keep your camera handy this summer as the 2015 Photo Contest will open this fall for submissions! To view the full gallery go to: [http://www.smenet.org/page/index.cfm?title=Photo\\_Contest\\_Winners](http://www.smenet.org/page/index.cfm?title=Photo_Contest_Winners).



## Marjorie Gale named Vermont State Geologist

**Lee Allison**  
Association of American State Geologists



**Photo Credit: AASG. Photo by Brian Pfeiffer.**

Marjorie Gale will become the next State Geologist of Vermont beginning Dec 29, 2014.

She has worked as a geologist at the Vermont Geological Survey since in 1996 and her primary responsibility was completion of the 2011 Bedrock Geologic Map of Vermont, a collaborative project of the Vermont Geological Survey (Agency of Natural Resources), the US Geological Survey and the University of Vermont. The work entailed field mapping of Vermont's bedrock at various scales, compiling and editing diverse data from more than 100 scientists to create a defensible map, creating cross-sections which show the interpretation of geology at depth, and working with the USGS team to produce the final cartographic product. The bedrock map incorporates 30 years of mapping and highlights the present understanding of Vermont geology.

Ms. Gale has also worked on statewide groundwater, energy (CO<sub>2</sub> sequestration) and ecological studies, and has a broad perspective of geology and natural resources in Vermont. She received a B.A. in Geology, cum laude, from the University of NH in 1974 and an M.S. in Geology (1980) from the University of Vermont. Her thesis, "Geology of the Belvidere Mountain Complex, Eden and Lowell, Vermont", involved bedrock mapping, structure, metamorphic petrology and geochemistry. Experience prior to joining the VGS includes SEM and XRD applied

to core analyses, and education. She has been an effective collaborator with state and national partners. Her experience extends beyond science to the organizational processes and communications and over the years she has been active in providing research and information to support the myriad of services and science-based advice provided by the Vermont Geological Survey.

## New Zealand Researchers Develop Inventive Low-P Farming System

**Madeline Fisher**  
Soil Science Society of America

Managed pastures are often sown as mixed swards of a grass and a legume, but in New Zealand there's a movement afoot to separate the two. Planting adjacent monocultures of each crop is already known to boost the quality of livestock forage. Now the thought is it could improve environmental quality, too.

The goal is to stem phosphorus pollution from some of New Zealand's newest pasturelands. Sheep used to be the mainstay of the country's agricultural economy, but today's cash cow is literally that—the cow. During the last 20 years, New Zealand's dairy herd has doubled in size to 6.5 million animals, nearly all of which graze forage year-round, explains Rich McDowell of Lincoln University and AgResearch, a commercial research institute owned by the New Zealand government.

As a result, farms have increased in size and expanded onto lands that were once grazed by sheep, but are considered only marginal for dairying.

What makes them marginal are their location—in cool areas of rolling topography at high elevation—and their soils, which have poor structure and are easily compacted by the hooves of cows. These soils are also wet in winter, so "clearly to make them productive, folks have installed mole-pipe (tile) drains to drain what were ephemeral streams," McDowell says.

Increased compaction can cause phosphorus fertilizer and manure to run off the surface. Meanwhile, the mole-pipes provide a belowground pathway for phosphorus to travel directly into sensitive downstream waterways. To curb both types of losses, McDowell and his co-authors



**A demonstration of the split grass-clover system in an experimental watershed in New Zealand. Note the ryegrass next to the fenced-off stream and the clover planted upslope. Image Credit: Rich McDowell.**

have now developed an inventive low-phosphorus farming system.

The system described in the Nov.-Dec. 2014 issue of the *Journal of Environmental Quality* has two key pieces. Tillage is performed next to stream banks only, followed by the sowing of two monocultures: ryegrass—a low phosphorus-requiring crop—alongside the stream and clover—which needs more phosphorus fertilizer—upslope of the ryegrass.

What tillage does, first off, is redistribute phosphorus-enriched soil at the surface throughout the entire plow layer of soil, lowering phosphorus concentrations there by about half. Tillage can also break up the soil's network of macropores, forcing phosphorus-laden water from the surface to interact with the soil matrix, rather than bypassing it to enter drainage pipes and, hence, the stream.

Plus, any surface runoff moving from high-phosphorus areas of clover will infiltrate into tilled areas that are now lower in the nutrient, thanks again to the redistribution of high-phosphorus topsoil by plowing. In other words, McDowell says, "high P runoff transforms into low P subsurface flow."

That's the principal mechanism, he continues, and then because "you're planting a species [near the stream], ryegrass, that does well on low phosphorus soil, you're having to put a lot less phosphorus on over time and the soil loses less." Meanwhile, clover is released from competition with ryegrass, allowing the legume to grow better and producing more high-quality forage.

In short, the practice could be a double victory for profitability and the environment—which is exactly what's needed to inspire adoption. It's a double victory in another way, as well: tackling both surface and belowground losses of phosphorus in one fell swoop.

This story originally appeared in the Feb. 2015 issue of *CSA News* magazine, accompanying the article, "Subsoil phosphorus loss: A complex problem with no easy solutions."

## International Science Organization Makes Research More Accessible to the Public

Joan Buhrman  
American Geophysical Union

Washington, DC— The American Geophysical Union (AGU) and Wiley have announced that starting in January 2015 they will offer free online access to all AGU journal content (published from 1997 forward) in public libraries throughout California for onsite use. In addition, schools and programs that participate in AGU's Bright Students Training as Research Scientists (Bright STaRS) program—which brings middle and high school students from after-school and summer research program to the annual AGU Fall Meeting to present their research alongside the leaders of the Earth and space sciences—will be given free access. By expanding public access to this groundbreaking Earth and space science research, AGU hopes to help improve public understanding of the impact science has on the world around them and its potential to help ensure a sustainable future for us all.

"As a leader in the scientific community, the American Geophysical Union has a responsibility to advance our science and support the execution of high-quality research. However, we have an equally important responsibility to share the knowledge we gain as widely as possible so that it can be of the greatest benefit to society. I'm excited to say that this new program represents an important next step in our commitment to find new and innovative ways to improve access to our content," said AGU executive director/CEO Christine McEntee.

This new development marks the latest innovation in AGU's publishing strategy. Earlier in 2014, AGU announced that it would offer free access to all journal content from 1997 forward on a 24-month rolling embargo, and it has three fully open access journals—JAMES, Earth's Future, and Earth and Space Science, which recently published its first articles. AGU also participates in Wiley's Research4Life program, which enables more than 5,000 institutions in developing nations to freely access journal content, and it offers green open access after six months, which allows authors to place a copy of their article in an institutional repository.

"As AGU's publishing partner, we are proud to support AGU's Science & Society mission to increase awareness of the importance of Earth and space science issues through this initiative. Our hope is that the California public libraries will benefit from this enhancement to their services, encouraging more customers to visit their local library" said Colette E. Bean, VP & Publishing Director, Global Research, Wiley.

Public libraries in California interested in participating in this new program should contact [cs-journals@wiley.com](mailto:cs-journals@wiley.com).

Joan Buhrman, [jbuhrman@agu.org](mailto:jbuhrman@agu.org), 202-777-7509 (w), 571-213-3812 (c)

## Newest Geoscientists Without Borders (GWB) Projects

**Society of Exploration Geophysicists**  
**"Groundwater resources for small rural and aboriginal communities in Chaco province, Argentina" - Universidad Nacional de La Plata (UNLP). \$100,000 GWB funds**

"In the Chaco-Pampeana northern region of Argentina, particularly in Chaco Province, there exists severe socio-sanitary problems associated with the scarcity of suitable drinking water. Even though the main source of water supply in the region is surface water, this is limited and there is not enough due to different environmental reasons. In this general context, the goal of this project is to locate groundwater resources for small rural and aboriginal communities in Miraflores (Chaco)."

**"Assessment of flood damaged infrastructures in Bosnia & Herzegovina and Serbia" Association of Geophysicists and Environmentalists of Serbia (AGES) - \$100,000 GWB Funds**

"The recent torrential rainfall in Balkan region (May 2014) caused extensive flood damage in Bosnia & Herzegovina and Serbia. The number of landslides exceed several thousand, damaging roads, bridges, buildings and other infrastructure in the catchment area along the River Sava in Bosnia and Herzegovina and Serbia. The local community suffers from difficulty in daily life and the fear of further landslides. For effective repair of





**Landslide in the center of Valjevo town (Serbia). Photo Credit: Geoscientists Without Borders**

the roads, information about the ground strength and condition is essential. The project is designed to combine several methodologies in a time-lapse manner in order to develop an effective methodology that could be applied country wide to better understand present conditions and prevent future landslides."

## GWB Proposal Process

The entire application process for GWB projects takes between 4-6 months from the first submission to the final selection.

January 2015 SEG received 15 Phase I applications for review. The GWB Technical committee will review and rank each of them. Their consensus in late February will determine which projects move into Phase II. Project managers then have an additional 30 days to submit a more defined project application for final review and selection.

Grant agreements are then negotiated between SEG and the Project Manager's organization. The first payment from SEG can be expected in month 7 or month 12 depending on the complexities involved.

What about your proposal? Do you have one to submit? Be sure to review the "Attributes of a Winning GWB Proposal" at the website [www.seg.org/gwb](http://www.seg.org/gwb).

## Upcoming Events

- March 23rd at 11:30am GWB luncheon at SAGEEP. Learn more about Registration. Event takes place at Sheraton Austin at the Capitol: Austin, Texas.
- April 16th GWB Project Webinar (1 hour). For an invitation contact Rhonda [Jacobsrjacobs@seg.org](mailto:Jacobsrjacobs@seg.org).
- June 8 is the Next Deadline for Phase One proposals - [www.seg.org/gwb](http://www.seg.org/gwb).
- November 12th Denver Geophysical Society Luncheon - Guest Speaker Dr. Roel Snieder, Past Chair

Geoscientists Without Borders® Committee -[www.denvergeo.org](http://www.denvergeo.org).

Geoscientists Without Borders® projects are made possible through generous donations to the SEG Foundation. We thank these companies and our many individual donors.

We need your help to reach more communities around the world!

Check with your employer or our development team to see how you can double your impact, or visit us at [www.seg.org/donate](http://www.seg.org/donate) to make a donation.

## AAPG Foundation Joins Geoscientists Without Borders

**April Stuart**

**AAPG Foundation Program Coordinator**

The AAPG Foundation has joined the Society of Exploration Geophysicists (SEG) and the Society of Exploration Geophysicists Foundation (SEGF) as a partner in the acclaimed Geoscientists Without Borders (GWB) program.

The agreement was finalized in a signing ceremony in late November, attended by AAPG Foundation Executive Director David Curtiss and Deputy Executive Director David Lange.

The Foundation's associate-level commitment will bring a higher profile to geologists and geophysicists who are using scientific methods to help impoverished communities around the globe, and ensures important additional program funding required to continue the program's success.

The Geoscientists Without Borders program was established by the SEG Foundation in 2008 with a \$1 million leadership investment from Schlumberger. It supports humanitarian applications of geoscience around the world.

The program has proudly awarded 21 projects in 17 different countries, and most recently was honored by World Oil with its 2014 Best Outreach Award.

Current program projects include:

- Archaeology (Thailand, Greece)
- Earthquake preparedness (Jamaica, Haiti)

- Landslide preparedness (Sweden, Brazil)
- Pollution mitigation (Romania)
- Tsunami preparedness (Indonesia)
- Habitat management (Australia)
- Volcano preparedness (Nicaragua, Guatemala)
- Water management (Honduras, India, Australia, South Africa, West Africa and Cameroon)

"The AAPG Foundation is excited to support Geoscientists Without Borders," said AAPG Foundation board chairman Jim Gibbs. "Supporting geologic initiatives that also help provide communities with healthier places to live is of real value to us. Obviously, the global aim and application of the humanitarian aspects of geoscience are efforts we can truly be proud to support."

SEG president Chris Liner called GWB "a premier humanitarian program" that benefits those far beyond the SEG and AAPG community – "a truly global outreach project that has been rightfully recognized."

Learn more about [Geoscientists Without Borders](#).

## SSSA Blog Published!

**Susan Fisk**

**Soil Science Society of America**

Did you know that SSSA has a public-information blog called Soils Matter? Visit <https://soilsmatter.wordpress.com> to learn more. If you have ideas for blog posts, please submit them in the "comments" section at the bottom of the page.

## Geological Society of America Completes Archive Project

**Kea Giles**

**Geological Society of America**

The Geological Society of America has completed a major publications digitization project that includes books, maps, and journal content published by the Society since 1890. More than 865 e-books and 187 years of journal content are now available through a variety of locations, including the Society's Web site at [www.gsapubs.org](http://www.gsapubs.org), the Society's online storefront at <http://rock.geosociety.org/store/>, GeoScienceWorld, Geofacets, Amazon, iBooks, and Google Play.

"This represents a major milestone in our pursuit to make more geoscience research available," said GSA Publications Committee Chair Jennifer A. Thomson. "Usage has shown that this research remains valuable long after it was originally published. Making this content accessible honors the time and effort of these authors and ensures that their work will be widely used well into the future."

The list of journals and book series that are now completely digitized include:

- Geological Society of America Bulletin
- Geology
- Geosphere
- Lithosphere
- GSA Special Papers
- GSA Memoirs
- GSA Field Guides
- Reviews in Engineering Geology
- Decade of North American Geology
- Maps and Chart Series
- Digital Maps and Chart Series
- Engineering Case Histories
- GSA Microform Publication Series, and
- numerous one-off titles.

For additional information, contact GSA Publications Manager Matt Hudson, [mhudson@geosociety.org](mailto:mhudson@geosociety.org); <http://www.geosociety.org/>

## SEG Denver 2014 Technical Program Presentation Recordings Available for Purchase!

**Jenny Cole**

**Society of Exploration Geophysicists**

Each year, SEG records a large selection of speakers and presentations from our annual meeting's technical program. This collection of presentation recordings are now available for purchase by topic (i.e. Full Waveform Inversion, Interpretation, Rock Physics, etc.) for the first time. 26 topics totaling more than 350 recordings from the SEG Denver 2014 Annual Meeting are currently available - online streaming only. Hear the speakers' presentation and see the slides from the convenience of your personal computer.

Visit the [SEG eShop](#)

Learners will have access to the Technical Program Presentation Recordings for a period of 2 years after product is available.

For more information or questions, please contact [SEG On Demand](#).

## Report on Activities Associated with the 47<sup>th</sup> Annual Meeting of the AASP-The Palynological Society

**Mendoza, Argentina, September 28-October 4, 2014**

**Thomas Demchuk  
The Palynological Society**

The 47th Annual Meeting of AASP-The Palynological Society was held in conjunction with the 4th International

Palaeontological Congress in Mendoza, Argentina. The heart of Argentina's wine country, with the perfect backdrop of the majestic Andes Mountains provided the setting for intense geological discussions and for enjoying the local culture and cuisine. Approximately 50 AASP-TPS members attended the associated events, while the larger IPC4 attracted nearly a thousand participants. The Congress Organizers were overwhelmed but everything seemed to run extremely smoothly, including the AASP-TPS sponsored technical and social events. We owe a huge thanks to Drs. Claudia Rubinstein and Mercedes Pramparo for their organization of the local AASP-TPS events while also taking care of larger IPC business.

The Congress began with an Icebreaker on the Sunday evening following the opening ceremonies. A live tango band provided musical entertainment while glasses of Argentinian Malbec and Chardonnay were served along with local culinary delights, including empanadas. The main lobby of the host Sheraton Hotel was filled with attendees having a great time.

In total, 47 Abstracts were submitted for the associated AASP-TPS technical sessions. Due to time limitations, only 24 were accepted as oral presentations, and 23 were given as posters. Monday morning started bright and early with the first of three oral technical

sessions. Keynote speaker Paul Strother started things off with a presentation on early Paleozoic cryptospores and associated evolutionary aspects. The remainder of the morning presentations concentrated on Paleozoic palynology. The afternoon session was initiated by Mike Stephenson's keynote presentation on the late Paleozoic palynology of the Middle East region. This was followed through the remainder of the afternoon by late Paleozoic and Mesozoic themed papers.

Monday evening saw the seating of the first of two necessary AASP-TPS Board Meetings. President Lanny Fisk presided over a number of necessary discussions although time was at a premium. Many topics were tabled for future discussion and decision, while significant items such as new website design and construction were given much debate. Upon closure of the meeting, many of the Board walked the short distance to a nearby parilla (Argentinian BBQ) restaurant where good food and wine extended the meeting discussions.

Tuesday morning saw the final of the three AASP-TPS sponsored oral technical sessions move forward with a keynote address by Jim Riding on evolutionary aspects of dinoflagellates. That was followed through the remainder of the morning by late Mesozoic, Cenozoic, and miscellaneous palynological presentations. In all, the technical sessions were of extremely high quality and the oral/poster presenters are to be thanked for their contribution to a very successful meeting.

On Tuesday evening instead of the usual business luncheon, AASPTPS held a Social Evening in the Kitek Cava Wine Cellar/Grotto of the Huentala Hotel. Thirty members attended the event and the cellar/grotto provided an excellent setting: wine was plentiful and the finger food was extremely appetizing (including empanads filled with goat meat). President Lanny Fisk presided over the evening as we held our necessary business meeting which included saying goodbye to outgoing Board members and saying hello to newly elected ones. Of significance, two awards were given to long-standing volunteers to the Society. Reed Wicander received the AASP-TPS Distinguished Service Award for his long-standing service to AASP-TPS, including two tenures on the Board and 28 years as Book Review Editor. Such longevity and volunteerism is what makes the Society great and Reed is a truly deserving recipient of





*Past President Lanny Fisk and President Jen O'Keefe*



*Reed Wicander receiving his award from Jen and Lanny*



*Thomas Demchuk receiving his award from Jen and Lanny*



*Jamie L. Boyd (University of Leeds) and Lanny Fisk*

the Award. Additionally and surprisingly, Thomas Demchuk received the Board of Directors Award for his 18 years as Secretary-Treasurer of the Society, as well as an earlier term as Director-at-Large. This is only the second time this award has been presented by the Society, the first recipient being Robert Clarke.

In addition to these two prestigious awards, the Board also presented the awards for the best oral and poster presentations from the previous technical sessions. The L.R. Wilson Student Paper Award went to Jamie Boyd for her presentation, "A Review of Dinoflagellates and their Preferred Habitats." The Vaughn Bryant Student Poster Award was presented to Heda Agić for her poster, "Cyst and Operculum Formation in Cambrian-Ordovician Galeate Acritarchs from Estonia: Implications for the Algal Phylogeny and Blooms in the Early Paleozoic." Finally, the award for Best Overall Poster Presentation was given to M. Sol González Estebenet for her poster "Dinoflagellate Cyst Paleobiogeography During the Middle Eocene in Southern Southwest Atlantic Ocean." In proper tradition, Lanny then handed over the AASP-TPS copy of Robert's Rules of Order (signed by all previous Presidents) and the ceremonial gavel to incoming President Jen O'Keefe. Jen then introduced incoming Board members including Director-at-Large Kara Bogus, the new position of Student Director-at-Large Kimberley Bell, and incoming Secretary Stephen Stukins. President-Elect Guy Harrington was unable to attend the meeting. Finally, Jen gave her Presidential Address and spoke about future plans which she hopes to carry forward during her tenure. Upon adjournment of the Business Meeting, the wine and food was again the focus of attention along with good discussions.

Wednesday was an off-day for the Congress which allowed for many to attend the mid-Congress fieldtrips. Others simply enjoyed the time to themselves discovering Mendoza and the surroundings. There were also several pre- and post-meeting fieldtrips. The general Thursday and Friday technical sessions concentrated heavily on vertebrate paleontology, particularly the new discoveries of dinosaur species in Argentina. Thursday evening presented the Congress Gala Dinner held at the Septima Winery in nearby Lujan de Cuyo. Participants got off the bus to be greeted with glasses of Septima sparkling wine and plates of excellent finger food. The dinner



**Image Credit: AASP**

included local Argentinian beef accompanied by Malbec (of course). Of significance was a Tango show presented for the entertainment of the audience. A professional group of 10 tango dancers showed off their talents and captured the attention of everyone: the Tango is the national dance of Argentina and its sensuousness can only be mastered through years of practice. For fun near the end of the program, the dancers then chose partners from the general audience to dance with. The evening continued with a live band providing excellent music and the dance floor was full for much of the remainder of the evening. The buses finally drove back home with many participants arriving back at the hotel well after midnight.

Friday evening saw the second of the two necessary AASP-TPS Board Meetings held, with new Board members and guests in attendance. Several bottles of Malbec mysteriously appeared which greatly helped with the discussions. President O'Keefe led the meeting and laid

out her plan of attack towards many important AASP-TPS happenings: with the assistance of old and new Board members there will hopefully be no problem meeting all the objectives. The meeting adjourned, and 30 AASP-TPS members climbed onto a bus to have dinner at the famous Zuccardi Winery in neighboring Maipu. The drive was a bit long, but the wait was worth it. The Zuccardi Winery has the reputation of serving some of the best Argentinian asado/BBQ in the region, and no one was disappointed. The wine flowed abundantly, and the trays of meat kept appearing from seemingly out of nowhere to fill our plates. The service was outstanding and it was a great way to end the week.

For those who chose to stay through the weekend, on Saturday AASP-TPS sponsored a wine tour to the southern region of Valle de Uco. Nineteen members took part in the trip to a unique and fastgrowing wine-growing region of Mendoza province. Unfortunately the weather was not our friend, and gloomy gray skies with low cloud shrouded the Andes.

Our first stop was the Salentein Winery where we took part in a tour of the wine-making facilities, and finished up with a tasting of three of their varietal wines. We then sat down for a relatively lengthy lunch, partly so because of a mix-up of orders and not all people getting their correct dishes. We finally finished and headed to our second winery, the nearby Andeluna Cellars. The tasting room and restaurant are appointed in Mendocino fashion with open wood beams and tile, open fireplaces and large overstuffed leather furniture. The hostess was extremely gracious given our late arrival and after a short tour of the wine-making facilities we got down to the business at hand: tasting great Andeluna wines. The day finished on an extremely high note with the great wines and participants purchasing several bottles to take home: the hostess showed her appreciation by continuing to pour tastings as we waited for the necessary transactions to take place. After all the great wine we boarded our bus and started on the journey back to rainy Mendoza.

Despite the long journey necessary to get to Mendoza (and the sometimes difficult Argentinian timetables) I believe that everyone who attended the meeting had a great time and came away with an extremely positive view of Mendoza, and Argentina in general. The local Organizing Committee, especially Drs. Rubinstein and Pramparo, are to be commended and thanked again for their hard work not only towards to the general Congress, but in making sure the AASP-TPS events were high priority. Please look forward to upcoming news on the 48th AASP-TPS Annual Meeting which will be held in Baltimore, MD in conjunction with the Geological Society of America. President O'Keefe and local meeting organizers Peter McLaughlin, Lucy Edwards, and Deb Willard will be looking for volunteers to Chair topical sessions, and for others to submit abstracts. As with our previous functions with GSA, it should be a great meeting.

For the complete article navigate to the AASP Newsletter: <http://www.palynology.org/repo/file/newsletters/nl47-4.pdf>

## A Mutually Beneficial Relationship

### AAPG-NAPE Celebrating 20 Years of Collaboration

**Carol Cain McGowen**

#### **American Association of Petroleum Geologists**

A concisely worded 20-year-old message written on AAPG letterhead announced the beginning of a long relationship.

Dated June 20, 1994, the well-preserved letter from then-AAPG Executive Director Fred Dix is addressed to Dr. O.F. "Layi" Fatona, President, Nigerian Association of Petroleum Explorationists.

In it Dix writes: "I am pleased to inform you that the House of Delegates of AAPG approved the application for your society's affiliation. The affiliation is now completed, and I have every confidence that it will be mutually beneficial."

And since the formalities of that early communication between the two association leaders, the benefits have indeed been mutual.

At the time, NAPE's presence in Nigeria was well established. For AAPG, affiliation with the Nigerian Association provided an avenue for extending AAPG programs and services into sub-Saharan Africa. Previous AAPG affiliations were with two northern Africa societies – first, with the Earth Science Society of Libya in 1973, and second, with the Egypt Petroleum Exploration Society (EPEX) in 1984.

By the date of its affiliation with AAPG in 1994, NAPE was a seasoned organization.

Initially, the group formed in August 1975 under the name of Lagos Society of Geologists and Geophysicists. From the small local group of only 25 people attending its inaugural meeting at the Federal Palace Hotel in Lagos, the society soon expanded its membership and changed its name to accommodate colleagues from across the country.

Today NAPE represents over 8,800 individual members and 152 corporate members. From its headquarters in Lagos, NAPE has expanded its reach to include four regional chapters in Port Harcourt, Benin, Warri and Abuja.



More than 30 annual NAPE conferences have been held to date.

## Out of Africa

In the beginning, the August 1990 AAPG EXPLORER could be credited as catalyst for NAPE's eventual affiliation with AAPG.

In a letter dated Oct. 9, 1990, Toyin Akinosho with Gulf Oil Company Ltd., a Chevron subsidiary, wrote to AAPG on behalf of the Nigerian Association. Akinosho reported reading about the first AAPG international Distinguished Lecturer program and the tour of professor Peter Vail, who had toured eight Pacific Rim countries earlier that year to lecture on the topic of "seismic stratigraphy."

Akinosho's letter congratulated Vail and the AAPG for "this attempt at globalization of the knowledge of petroleum geology."

Then describing the growing community of oil explorationists in Nigeria, Akinosho wrote, "NAPE is ready to coordinate a Distinguished Lecture tour of West Africa from Lagos."

A few weeks later, Gary Howell – then AAPG science director and international development adviser, wrote to Akinosho to say, "The reason for my writing is to extend an offer to NAPE to consider affiliation with AAPG."

NAPE's Executive Committee did consider, and four years later, with Layi Fatona as president, decided to affiliate.

"We did all that was required," Fatona recalled. "We were admitted, and I indeed addressed the House of Delegates at the (AAPG) annual convention."

Fatona also clearly recalls his message to the convention attendees.

"I proudly told the audience my prediction, that outside of the United States, and perhaps the U.K., the single largest one-country collection of AAPG members will be my country – my Nigeria and the Niger Delta oil province," he said. "I was proud then as I have remained to date, to have taken NAPE to this international level."

Those who were in attendance at the AAPG opening ceremony in 1994 recall how the process was formalized with the reciprocal attendance and participation of AAPG President Toby Carleton at the 1994 NAPE international conference and exhibition held at the old banquet hall of Eko Hotel in Lagos.

Some still remember "as if it were only yesterday" how Carleton opted to break all protocols and security by riding around Lagos in a personal car.

On his tour Carleton saw "the contrasting sides of Lagos," one eyewitness recalled. "No sirens and no escort car, driving past Jankara Market, the largest market in Lagos, where they sell everything from tie-dyed cloth and trade beads to herbs and traditional medicines, to Tafawa Balewa Square, Victoria Island, with its imposing buildings and memorials to World War I and World War II fallen soldiers.

"It was then," he continued, "that he (Carlton) realized that Lagos could have been any other city in the world, with all its shams, drudgery ... and glistening neon lights."

## An Ongoing Relationship

Opportunities for collaboration and cooperation between AAPG and NAPE have been many.

For example, the groups joined together to run two deepwater Western Africa conferences (DOWAC), in 2004 and 2010, in Abuja – "major collaborate events in which NAPE provided the platform while AAPG provided the quality control and editing," said past Region president Gilbert Odior.

"It also is worthwhile to mention that the activities of NAPE led to the formation of the AAPG Africa Region," he added, "and since its formation NAPE has provided more than 80 percent of the regional presidents and officers."

In recent years, the two associations have worked together closely to reach out to universities in Nigeria, with AAPG Africa Region members and NAPE members expanding the reach of the Imperial Barrel Award Program since 2008. In many cases IBA judges and mentors were both NAPE members and AAPG members.

Then in 2013, the two affiliates worked together to offer a Local-Student Chapter Leadership Summit. AAPG Africa Region Vice President Femi Esan attended Leadership Days the previous year to learn the L-SCLS model and implemented the program during the annual NAPE conference.

The next L-SCLS is planned Nov. 11-13 during this year's NAPE conference.

Thanks to collaboration with NAPE, there are 24 AAPG student chapters in Nigeria. The first AAPG student

chapter formed in 1999 at the University of Calabar. Then after a hiatus with no new chapters forming for several years, 2001 brought a resurgence – since then, new chapters have formed across Nigeria nearly every year.

Since Carleton's visit to commemorate the AAPG-NAPE affiliation, other AAPG presidents and executives have flown across the Atlantic to pay respects to the relationship, learn from Nigerian geoscientists and benefit from NAPE's hospitality.

Those who have visited Nigeria and participated in NAPE conventions are past AAPG presidents Robbie Gries (2000, 2001) and Scott Tinker (2008), Alfredo Guzmán (2010), Stuart Harker (2011), David Curtiss (2012) and Alan Wegener (2013).

Robbie Gries was AAPG's first female president-elect when she traveled to Nigeria in 2000 for NAPE's 20th anniversary. The following year as president she attended the NAPE annual meeting in Port Harcourt.

For Gries, both trips were rich with experiences among the working professionals and students of Nigeria.

"It was truly impressive the way this organization had grown and become a major influence in the professionalism of its members," she said.

Friendships forged and memories of these visits remain strong to this day for Gries. But her lasting memories are of the students.

"With only an hour's notice, for both me and for the students attending NAPE, I gave an impromptu talk for 800-900 enthusiastic students," Gries said. "They were so eager to develop as geologists – and they all wanted a photo with the AAPG president!"

NAPE currently has its first female president in Ade-  
doja oja Ojelabi – and considering over 60 percent of the NAPE members are students and young professionals, Ojelabi meets a lot of students and young professionals at NAPE events.

"With such a huge population of young talent, it is equal parts gratifying and equal parts challenging," Ojelabi said.

"It means NAPE must tailor programs to their demographics that will grab their attention and sustain their interest. That is the only way to ensure that they transition from students to young professionals and eventually active members," she added.

The responsibilities of being a role model for young talent is a fact not lost on AAPG President Randi Martinsen.

"My election as the second female president of AAPG and Doja Ojelabi's election as the first female president of NAPE is clear evidence of both AAPG and NAPE valuing the leadership capabilities of women," Martinsen said. "I hope Doja and I as role models of successful female leaders in the petroleum industry encourages more women to become petroleum geoscientists."

"West Africa is an important hydrocarbon province and the challenges facing our industry to find and produce hydrocarbons are immense," she added. "Organizations like AAPG and NAPE are important contributors to the technical and professional development of these young geoscientists."

## International Medical Geology Association (IMGA)

### International Medical Geology Association



The overall objective of IMGA is to facilitate interactions between geoscientists and biomedical/public health researchers in addressing human and animal health problems caused by geologic materials or geologic processes. The Association is a

"policy neutral" organization. The specific objectives of the organization include:

- To stimulate interest and promote research in medical geology.
- To provide a forum for discussion, to disseminate information, and to provide educational opportunities in medical geology.
- To promote state-of-the-art technologies in medical geology.
- To inspire the highest standard of professional ethics of its members.

During 2014, many activities have been carried out. Medical geology has been included in curricula at universities, has received several prestigious awards and has been highlighted all over the world. Courses and presentations have been held at meetings and conferences

dedicated to public health, geosciences and medical sciences. IMGGA also hosted its first webinar in November 2014 for all members, entitled Health and Earth- Medical Geology. Building a Safer Environment.

IMGGA has established a Chapter Stimulus Contest to help support the activities of Local Chapters. IMGGA made a US\$1000 prize available to support a project carried out by a Local Chapter to promote Medical Geology in their country. The next IMGGA Chapter stimulus deadline is 30 May 2015.

### Medical Geology & The Community

Many IMGGA local chapters work closely with government and other professional organizations. For instance, the Local Chapter (Asociación Argentina de Geología Médica) signed a collaboration agreement with ASAGAI (Argentinean Association for Engineering Geology), a member of the IAEG (International Association for Engineering Geology and the Environment). Both parties aspire to enhance their effectiveness in fulfilling their tasks through mutual cooperation. The Japan Chapter closely co-operates with the Japan Branch of International Union of Geological Sciences Commission on Geo-Science for Environmental Management, Working Group of Manmade Strata and Geopollution, Japanese Society of Geo-pollution Science, Medical Geology and Urban Geology Association, and the Geological Society of Japan.

With the aim of studying of radon distribution in the territory of Azerbaijan, the Azerbaijan chapter and the Institute of Geology of Azerbaijani National Academy of Sciences has started maintaining a project based on a grant from the Swiss National Scientific Foundation (SNSF). The period of research began in 2010 with the use of 2,500 SNSF-supplied radon detectors that collected "Gammadata." From the cadastre of radon, maps of radon activity and relative concentrations in Azerbaijan were created. Dangerous blocks of living quarters were revealed. The aim of the second phase of research was the application of Swiss technology to reduce anomalous radon concentrations in living quarters. The mutual initiative of scientists from Azerbaijan and Switzerland was supported again by SNSF headquarters.

In March, 2014, Maria Aurora Armienta of the Mexico chapter was invited to participate in a two-day workshop

organised by professors from Sonora State (North of Mexico) to begin developing the Geomedical Atlas of Sonora. The Atlas could be expanded to other States or even to the whole Country. The workshop was supported by the University of Sonora and the Centre of Research in Food and Development (Centro de Investigación en Alimentación y Desarrollo-CIAD). Participants were from several of Mexico's Academic and Governmental organisations: Universidad de Sonora, Instituto de Física, UNAM, Instituto de Investigaciones Biomédicas, UNAM, Instituto de Geofísica, UNAM, Instituto de Geología (Estación Sonora), UNAM, Centro de Estudios Superiores, Universidad Estatal de Sonora.

### Meetings & Professional Events

Dr. Mañay, IMGGA Chair and member of the Uruguay chapter was the invited speaker and member of the scientific committee of the "5th International Congress on Arsenic in the Environment" and was named to chair the Arsenic and Health sessions. This congress was held in Buenos Aires, Argentina May 11 -15, 2014 (<http://www.as2014.com.ar/>).

Medical Geology Symposium was hosted in Rasht, Iran with the help of the local chapter. At the opening ceremony, which took place with participation of health, environmental and geoscience professionals, Kim Esbensen, the research professor in Geoscience Data Analysis and Sampling at the National Geological Survey of Denmark and Greenland and chemometrics professor with the ACABS research group, Aalborg University, gave a keynote lecture on principles of Medical Geology. A number of articles enumerating state-of-the-art medical geology studies and related fields (geochemistry, hydrogeochemistry, natural radiogenics, geobotany, urban geochemistry, etc.) were proposed from various scientists and research institutes.

ROSGEO (Medical Geology Division of Russian Geological Society) worked on the organization of two conferences related to medical geology. The 5th Symposium on "Biogenic-Abiogenic interactions in Natural and Anthropogenic Systems" was held in Saint Petersburg State University on 20-22 of October, 2014. A second meeting, was the first International Conference on 'Endogenous Activity of the Earth and Biosocial



Processes' (GeoBio2014) and was held in Moscow, Russia on 5-7 November, 2014.

The University of Johannesburg is very proud to have launched and hosted the "1st International Symposium on Medical Geology in Africa" (ISMGAf). The event was inaugurated by Professor T.S. Maluleke Deputy Vice-Chancellor for Internationalisation highlighting the position of the University of Johannesburg in South Africa and in Africa in general and the important role it can play with regard to multi-disciplinary fields of science such as Medical Geology in Africa.

The event consisted of a one day symposium (oral and posters presentations) and two day short course presented by Prof Jose Centeno; a toxicologist from the Joint Pathology Center, USA) (Past Chairman, IMGA) and Dr Mark Cave who is the Medical Geology Project Manager, British Geological Survey (BGS), United Kingdom (UK). The total number of delegates was more than expected - up to 65 delegates. Thirty were post-graduate students representing 5 countries including South Africa, Nigeria, Germany, USA and UK. The oral presentations by delegates covered a wide range of topics from sources and characterisation of potentially harmful elements and compounds, to determination of geochemical backgrounds and development of comprehensive databases pertaining to medical geology, to the effects of geophagy in Africa. In addition, we were privileged to have Dr Madela-Mntla, Director of the ICSU-Regional Office Africa who gave a presentation in which she highlighted the objectives of the "Future Earth" 10 years ICSU initiative. At the end of the event, the South African chapter chairperson and chair of the 1st ISMGAf Prof Mouri gave concluding remarks, followed by a cocktail function marking the closing of a very successful 1st International Symposium on Medical Geology in Africa at the University of Johannesburg.

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A Medical Geology Session was held at the 21<sup>st</sup> Meeting of the International Mineralogical Association (IMA 2014), from 1 to 5 September, 2014. During this meeting, a special session dedicated to Medical Geology was organised as part of the South African Medical Geology Chapter activities. Another special session on: 'Medical Mineralogy' was organised by the South African Medical Geology Chapter members focused on developing countries. Detailed information on the event can be obtained from the following website, [www.ima2014.co.za](http://www.ima2014.co.za), or by email to [info@ima2014.co.za](mailto:info@ima2014.co.za).

The Mexican Chapter leader, Hector Rubio, developed a second course on Medical Geology during 2014 following another successful course carried out in March 2013. It was held second half of the year in Mexico City and was organized by Luis Humberto Colmenero, Maria Aurora Armienta and Ma. Elena Moreno (Universidad Autónoma de Guerrero). The location was selected to make IMGA more visible in the Centre of Mexico and involve colleagues mainly from Mexico City, Guerrero, Morelos, Puebla, San Luis Potosí and Veracruz States. Medical Geology was highlighted at the Geophysics Institute, UNAM, as it has been considered as one of the priority emergent research lines to be developed in the Natural Resources Department.

The Australian Chapter of IMGA has recently set up information about the Chapter on the professional network LINKEDIN (<http://www.linkedin.com/pub/imga-australia-chapter/95/b68/b9a>). With the aim to attract

more members and to keep them informed about activities and news. With the same aim we have setup a profile on Facebook (<https://www.facebook.com/people/Imga-Australia-Chapter>). In addition, we are preparing a proposal for the establishment of a course on Medical Geology at the University of Southern Queensland.

The Italian Chapter of the International Medical Geology Association actively participated in organizing the 1st International Conference on Atmospheric Dust: DUST 2014 – International Conference on Atmospheric Dust in Castellaneta Marina (Taranto, Italy), 1-6 June 2014 ([www.dust2014.org](http://www.dust2014.org)), and the Brazilian Chapter hosted a technical session entitled “Environmental and Medical Geology” was held during the 47th Brazilian Geological Congress in Salvador, State of Bahia, Brazil in September. More than 50 papers were submitted to that session. Based on research from the Bulgaria-Serbia IPA Cross-Boarder Programme: the Medico-biological and medical-social prerequisites for developing balneotherapy in the cross-boarder region, a conference on Regional Wellbeing Concepts in the Balkans “Innovative Balneology” was held in Kluchi, Russia November-2013. There a conceptual model for sustainability development of a medical spa in Bulgaria was presented using some geocological indicators for measurement.

Most of the members of the Japan Chapter had oral and poster presentations The Fourth International Symposium on Man-Made Strata and Geo-Pollution (December 1-2, 2014) or at the Japan Geoscience Union Meeting (April 28 to May 2, 2014) conferences. The presentations may not have focussed on health and medicine directly, but were related to them from a view point of the environment. Delegates from Pakistan participated in the 32nd National & the 1st International Geosciences Congress held in Iran (16 – 19 February 2014). See the report below. Additionally the Pakistani chapter shared in celebrations of World Earth Day (22 April 2014) and World Environment Day (05 June 2014).

## Selected Research

In preparation for the 6th International Medical Geology Conference, the Portuguese Chapter has highlighted the following research: Neurodegenerative diseases in Estarreja inhabitants and their potential relationship with trace elements in the environment - Project financed by

the OHM – Observatoire Homme Milieux; Social perception study for assessing environmental contamination effects on reproductive female health - Project financed by the OHM – Observatoire Homme Milieux; Oral bioaccessibility estimates of arsenic in street dusts from Estarreja city, Portugal, to assess exposure and risk to human health - Project financed by the OHM – Observatoire Homme Milieux; Translocation of toxic elements from contaminated soils into food stuff for human and animal diet; Pulmonary bioaccessibility of arsenic in indoor and outdoor household dust from Beduido- Estarreja, to estimate exposure through inhalation and risk to human health Project financed by the OHM – Observatoire Homme Milieux; Research on human bioaccessibility of potentially harmful elements in ground-level dust from the Bassin - Project financed by the OHM – Observatoire Homme Milieux; Minier de Provence and Estarreja: a multidisciplinary approach integrating geochemical, mineralogical, toxicological and health data - Project financed by the OHM – Observatoire Homme Milieux.

Research from the Mexican Chapter was recognized in the April, 2014, the Mexican peer-reviewed Journal “Tecnociencia Chihuahua” published the article: M.A. Armienta, R.B. Finkelman, H. Rubio-Arias, Medical Geology; its relevancy to Mexico, Vol. VII, No. 3, pp 152-162, 2013.

The Tiwanese chapter director, Dr Jiin-Shuh Jean at NCKU, has served as a lead guest editor for the Journal of Asian Earth Sciences (Elsevier) for a special issue about Medical Geology in Asia. Several papers from members of the IMGA Taiwan Chapter have been published in this journal. For more information, please access the Chapter website (<http://proj.ncku.edu.tw/imgatwn>).

## Education and Outreach

Uruguay chapter member, Adriana Mezzano, professor at the Faculty of Engineering of the Universidad de la República (UdelaR) has been working on “technology soils” which are generated from the evolution of man-made materials chaotically spilled. On December, 2013 she was invited to attend the Fourth International Symposium on Man Made Strata and Geo- Pollution that took place in Itako, Japan. This time she presented the paper “New soils in a young city : what is being done?”

## Medical Geology in Environmental Toxicology Curricular Course

Each year since 2005, this course was a curricular one held by the Toxicology Section for students of the Faculty of Chemistry at the University of the Republic (UdelaR). It was also an elective course for the postgraduate students of Master and Doctoral degrees. In this period we have had 25 attendees and members from the chapters are the main lecturers. <http://cursos.quimica.fq.edu.uy/course/index.php?categoryid=82>

## New edition of the book Essentials of Medical Geology

A new edition of the highly awarded book on medical geology was published in 2013 by Springer. This is a first IMGA publication. Almost all chapter have been updated, several chapters have been totally revised and two new chapters have been added.

## Collaboration with other groups and associations

- Society for Environmental Geochemistry and Health, SEGH (with an official representative of IMGA)
- IUGS International Union of Geological Sciences
- International Society of Medical Geography
- Nordic Working Group on Medical Geography
- International Association of Geochemistry and Cosmochemistry, Working Group on Geochemistry and Disease
- American Registry of Pathology
- Geomedical Committee of the Norwegian Academy of Science and letters
- International Society of Doctors for the Environment (ISDE)
- Geology and Health Division of the Geological Society of America

## Promoting Geoethics in Society: A New Challenge for Geoscientists

Silvia Peppoloni and Giuseppe Di Capua  
International Association for Promoting Geoethics



The Geoscience community is called to play an important role in society: helping in the defense against natural risks, orienting on global issues like climate change, looking for new ways to source natural resources

from a sustainable perspective, building a knowledgeable society and help to improve the living conditions of human life especially in low income countries.

This implies geoscientists are more aware of their social responsibility and capable of working by the principles of integrity, honesty with respect for land, water and air.

Many colleagues feel the need to found their activities on solid values, rediscovering a deep sense of duty within geological research and practice: to serve the public while respecting of the dynamics of Nature.

Geoethics consists of the research and reflection on those values upon which to base appropriate behaviors and practices where human activities intersect with the Geosphere. It represents an opportunity for Geoscientists, and for society as a whole, to give responses to these instances and to face the new challenges of our time.

To promote the debate on the ethical and social implications of the Earth Sciences, in August 2012, during the 34th International Geological Congress (IGC) held in Brisbane (Australia), a group of geoscientists founded the International Association for Promoting Geoethics (IAPG), by carrying out an idea already conceived on April of the same year, during the EGU General Assembly in Vienna.

IAPG is a multidisciplinary, scientific association dedicated to widening the debate on issue of Ethics applied to the Geosciences. It is a not-for-profit association, legally recognized with a public notarial deed, led by



an Executive Council, formed by a President, two Vice-Presidents, a Secretary General, a Treasurer and six continental coordinators.

IAPG's headquarters is hosted at the INGV – Istituto Nazionale di Geofisica e Vulcanologia (Italian Institute of Geophysics and Volcanology) in Rome (Italy) and the Italian branch has established a Section on Geoethics inside the Italian Geological Society. IAPG has 11 national sections (Brazil, Canada, Democratic Republic of Congo, Italy, India, Jordan, Malawi, Peru, Portugal, Ukraine, USA) and more than 520 members in 83 countries, in 5 continents.

IAPG is affiliated with the International Union of Geological Sciences (IUGS) and is a collaborative organization of the IUGS-TGGGP (Task Group on on Global Geoscience Professionalism). Moreover, IAPG is recognized as an Associate Organization of the American Geosciences Institute (AGI) and the Geological Society of America (GSA). While IAPG is working to strengthen the collaboration with other national and international organizations, on December 2014 has signed a Memorandum of Agreement with the European Federation of Geologists - EFG (the organization which joins associations of professional geologists in Europe) to collaborate in defining ethical problems in Earth Sciences, also through case-studies affecting professional geologists.

In 2014 IAPG created of a list of experts named, "Corresponding Citizens Scientists", on specific topics (currently: Teaching Geoethics and Geo-Education, Research Integrity, Geoscience Communication, Interdisciplinary explorations for main-streaming interest in Earth Sciences topics, Geoethical aspects in low income countries, Geoethics and young geoscientists).

Hundreds of people follow IAPG's social networks and in two years the IAPG website (<http://www.iapg.geoethics.org>) has got more than 6,100 visitors and 14,000 visits from 143 countries. IAPG manages a Blog (<http://iapgepoethics.blogspot.it>) with hundreds of subscribers, a LinkedIn Group "Geoethics and culture of geosciences" with 584 members, a Facebook page with more than 1,840 followers, and a Twitter profile with 700 followers.

The spirit of the IAPG is well expressed in its logo: it represents the Earth as an opened system that contains bio- and geo-diversity, and the quote "Placet natura regi terram" by Seneca (4 BC-AD 65), the Roman Stoic

philosopher, statesman, and dramatist, refers to the analogy in nature between all the things belonging to the Earth system (mineral, plant and animal kingdoms), that are closely connected. Humans have to consider these close connections when making decisions regarding the environment and resources. Geoethics can be a useful "tool" in this direction, helping in the respect of right balances.

The goal of IAPG is not to judge what is right and what is wrong: its main function is promoting the debate on ethical issues in Earth Sciences and developing shared values, tools, procedures, guidelines helping geoscientists to work better for themselves, colleagues and society, respecting the Planet.

Becoming an IAPG member is easy. We just request you create an account on the website <http://www.iapg.geoethics.org>. No fee is due!

Just in two years, IAPG has achieved important results on the base of a strategy rooted in its Constitution. IAPG members are promoting Geoethics through publications, sessions within international congresses, lectures and in meetings. Together, they are working to build a strong international network with the aim to involve as many colleagues as possible worldwide. IAPG represents a forum where people can exchange their views and share their experiences about ethical, social and cultural implications of geosciences.

IAPG members have edited 3 books on Geoethics collecting 87 chapters (with a peer review process) and a new book on Geoethics, with 21 chapters, is going to be published in the Lyell Collection of the Geological Society of London (see references).

IAPG has organized successful sessions on Geoethics at the European Geosciences Union General Assembly in 2013 and 2014; and again in 2015 (this session received 45 abstracts by authors from 14 countries), at the International Association for Engineering Geology and the Environment - IAEG congress (in 2014) and at the Geoitalia Congress (in 2013), collecting 150 abstracts in total. Moreover IAPG brought Geoethics to the 3rd World Congress on Research Integrity (WCRI) in Montreal (in 2013) for the first time, and will attend again for the 4th WCRI in Rio de Janeiro (Brazil).

In 2014, IAPG has contributed to the sessions on Geoethics at the American Geosciences Union - AGU Fall



Sessions on Geoethics organized in 2014 at IAEG congress (left) and EGU General Assembly (right). Image credit: IAPG.

Meeting in San Francisco and has brought for the first time a Geoethics communication at the Geological Society of America - GSA Annual Meeting 2014 in Vancouver.

IAPG members have also been invited to give speeches at important events. Among them:

- a lecture at the Offshore Technology Conference in Houston on May 2014 (OTC is the world's foremost event for the development of offshore resources in the fields of drilling, exploration, production, and environmental protection);
- an invited speech at the European Federation of Geologists annual workshop, in Palermo (Italy), on May 2014;
- a keynote speech in the workshop organized in Montana on June 2014, titled "Teaching GeoEthics Across the Geoscience Curriculum".

Finally, IAPG has taken an important role in writing and promoting the "Geoethical Promise", an Hippocratic-like oath for geoscientists, especially the youngest, whose formula was proposed in Matteucci et al. (2014).

IAPG's members can be proud: today geoethics is at disposal of all and has reached considerable popularity among geoscientists.

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Wyss M. and Peppoloni S. (Eds.). Geoethics. Ethical Challenges and Case Studies in Earth Sciences. 2015, p. 450, Elsevier, ISBN 978-0127999357.

#### IAPG web-pages

Website: <http://www.iapg.geoethics.org>.

Blog: <http://iapgeoethics.blogspot.it>.

Twitter (@IAPGeoethics): <https://twitter.com/IAPGeoethics>.

Linkedin Group "Geoethics and culture of geosciences": [http://www.linkedin.com/groups/Geoethics-Culture-Geosciences-4615518?gid=4615518&trk=hb\\_side\\_g](http://www.linkedin.com/groups/Geoethics-Culture-Geosciences-4615518?gid=4615518&trk=hb_side_g).

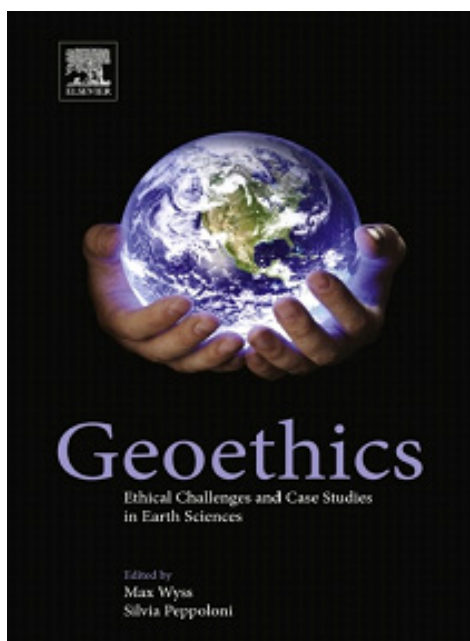
Facebook: <http://www.facebook.com/pages/International-Association-for-Promoting-Geoethics-IAPG/102926009863246>.

## Geoethics

### Voices of Practitioners Seeking Ways to do Better

**Max Wyss and Silvia Peppoloni**

**International Association for Promoting Geoethics**



Compared to the epidemic spreading of unethical behavior in the world, the problems in the geosciences seem minor. Nevertheless, we felt a need to increase the awareness of geoscientists that we carry a special obligation to the wellbeing of our planet and the population on it. In our book on Geoethics 33 chapters, authored by 48 experts voice their opinion about aspects of behavior by geoscientists that range from thoughtlessness to willfully deceiving the public.

This book includes a section on Philosophical Reflections and one on Geoscience Community which illuminates general aspects of Geoethics. A section on Ethics of Practice contains examples of how critical facilities may be built without proper consideration of natural hazards and how mining operations may ignore environmental consequences. In a section on Communication with the Public, Officials and the Media this sore point that has lead to a court case is discussed. In a section on Natural and Anthropogenic Hazards, several chapters are devoted to the question whether or not geoscientists are doing enough to protect the population. The need for special attention to indigenous and rural populations is underscored in a section on Low Income and Indigenous Communities.

This broad range of voices is still not broad enough to cover all aspects of the geosciences in which we should pause and ask ourselves: Are we doing our job in an uncompromisingly ethical way and such that the population at large, not just the ivory tower community, benefits? We hope that this book on Geoethics ignites wide discussions on problems beyond the ones that were touched on in this collection of chapters.

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Max Wyss and Silvia Peppoloni (Eds)

Geoethics: Ethical Challenges and Case Studies in Earth Sciences

2015, p. 450, Elsevier, ISBN 978-0127999357

Elsevier store:

<http://store.elsevier.com/Geoethics/isbn-9780127999357/>



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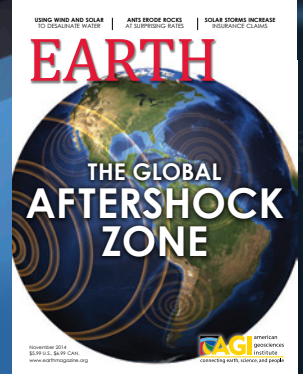
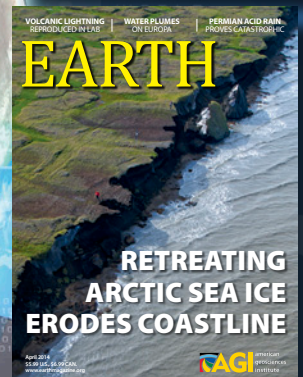
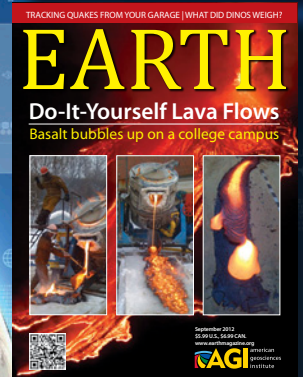
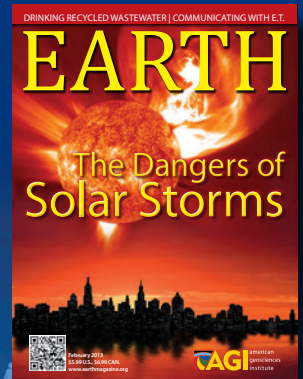


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connecting earth, science, and people



# I'm a geoscientist

**I'm-a-Geo-sci-en-tist** *n.* **1** The proud declaration of someone dedicated to the geosciences. **2** A really cool 1.75" x .5" lapel pin!!!

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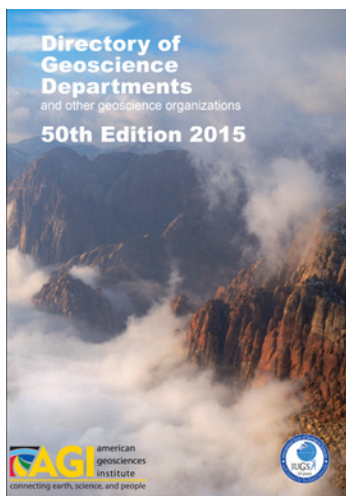
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## 50<sup>th</sup> Edition Directory of Geoscience Departments 2015

**Carolyn Wilson**

**American Geosciences Institute**



**Image Credit: AGI**

The Directory of Geoscience Departments, one of AGI's longest running publications, is the most comprehensive directory and source of information about geosciences departments, organizations, and researchers available. It is an invaluable resource for individuals working in the geosciences or must identify or work with specialists on the issues of Earth, Environmental, and related sci-

ences and engineering fields.

For 2015, AGI has published the 50<sup>th</sup> edition of this publication. In celebration of this milestone, a focus group was formed to discuss ways to make this publication more useful for the geoscience community. Thanks to their hard work, some changes have been instituted in this edition, and more updates should be expected in future editions.

For the 2015 edition, departments were able to provide social media contacts and indicate whether they host a field camp. The field camp listings are categorized as either open enrollment to students outside the department or department only enrollment. This edition also has two different faculty indexes sorting the faculty and researchers by their specialization and alphabetically. The focus group through the index by specialization may help students find future advisors, faculty find new collaborators, and industry representatives find new experts in their specialization.

Some basic statistics for the 50th edition of the Directory of Geoscience Departments: 2240 academic departments and programs globally, with 909 of those departments in the United States. Three hundred departments in the United States are two-year institutions. These numbers are slightly lower than those reported last year

due to some merging and closed departments, as well as a concerted effort by our part to more accurately classify academic departments compared to other geoscience institutions and organizations.

## Collaboration between the Deep Carbon Observatory (DCO) and AGI

### Increasing Participation and Retention of Racially or Ethnically Underrepresented Geoscientists at DCO

**Heather Houlton**

**American Geosciences Institute**

The American Geosciences Institute (AGI) has received support from the Alfred P. Sloan Foundation to increase the participation and retention of United States citizens and permanent residents who are geoscientists from underrepresented groups (African American, Hispanic, Latino/Latina, Native American, Native Alaskan, Native Hawaiian and Pacific Islander) participating in the Deep Carbon Observatory (DCO). The project will focus on bolstering and advocating a broad awareness of DCO activities for early- to mid-career underrepresented geoscientists, including graduating PhD candidates, post-doctoral fellows, assistant professors, and representatives in the private sector, in order to produce more active DCO participants.

AGI, the DCO Secretariat, and the four DCO Science Communities will collaborate to enhance the overall visibility of DCO to underrepresented groups in the geosciences, and provide opportunities to contribute to DCO's high profile, interdisciplinary research. For those underrepresented geoscientists who would like to participate in DCO research activities, but have financial limitations or challenges, there will be small awards distributed to selected geoscientists through a competitive application process. These individuals will receive seed funding to collaborate with DCO to support their work, and to encourage long-term participation within the DCO research community.

Through a cohort of role models and mentors, and by encouraging active participation within the DCO Science Network, AGI and DCO aim to realize each participant's full professional potential and posture them



for continued success throughout their career. AGI will continue to facilitate broad awareness of DCO through its geoscience community-wide network as well as targeted communications within its specific, diversity-oriented networks.

A year-end report anticipated in 2016 will describe the project's objectives, activities and also analyze its outcomes, which will be made widely available to the geoscience community via the AGI and DCO websites. The award proposal was led by Heather R. Houlton of AGI, who can be contacted by those interested in learning more about this project at [hrh@americangeosciences.org](mailto:hrh@americangeosciences.org).

## Realistic Advice for the New Geologist

**Michael J. T. Orobona, CPG-11099**

**American Institute of Professional Geologists**

The annual student issue of The Professional Geologist is an opportunity for any experienced AIPG member to write his/her personal vision of a commencement speech. Such advice at graduation may focus on the bright future ahead, the venerable profession we share, or being true to your passion. I will instead list the extra-curricular lessons I wish I had learned before embarking on my own journey below the surface of the Earth.

### Geology is special...to you.

Every paid occupation celebrates its vital contribution to society, some to nearly mythical status. As a small fraternity, geologists do not have the enormous public advertising capacity of the trades, nor typically the first-person contact and regular, direct demonstration of expertise afforded medical doctors, lawyers, clergy, or other professionals. Building mutually respectful, individual relationships with colleagues from other professions is a key to demonstrating the societal or business value of our profession and navigating a successful career in a world that largely doesn't know geologists.

Acquaintances outside the profession sometimes ask me what I do. Not always tongue-in-cheek, I answer that

"I write e-mails, make phone calls, and host meetings." For the management track that is no less "doing geology" than describing a rock or balancing a cross section, but the administrative aspects aren't for everyone. It's critical from the start of your career to periodically ask **what do I want?** Do you love field work? Do you want a family or to sleep in your own bed every night? If you put these questions aside in the excitement of your early career, other values will inevitably come into conflict with your livelihood. It's ok to want it all, but that means planning for it.

If you're looking for a stable career in a fluctuating job market, building upon entry-level skills is critical. Twentyfive, one-year experiences is not the same thing as 25 years of experience.

Multiple short-term placements under the umbrella of a single temporary employment agency won't hide that. Five years of increasing responsibility with a single organization is likely worth more to a potential employer than two decades of repeated tasks, even in a variety of geologic terranes. A high-performing geologist quickly learns to apply fundamental skills in any environment. There is room for the journeyman geologist, and for many people it is a rewarding career. But that person may become removed from the decision-making process, deprived of the opportunity to see conceptual ideas through to successful assessment.

Don't expect to be in management immediately, or even in a senior technical role. Industry boom times may temporarily allow accelerated promotion, but those who prove to be incompetent in their roles are the first to be swept away in the inevitable downturn. There is a time for lateral advancement, but I've had once-removed employees leave good learning roles for the promise of a small raise or a flashy-sounding title. Also, be aware of relative terminology; Vice President at some firms or small companies may imply less experience than Project Geologist elsewhere.

But the baton of leadership is in your backpack, if you choose to take it. Authority is given to those who ask for it and are willing to leave the comfortable role of familiar tasks. The wider perspective and extended lead-time of projects mean that job gratification may occur differently and less frequently than for early-career, task-oriented roles, but a managing role potentially can

be more deeply satisfying. And, leadership roles have higher earning power due to increased complexity and the inherent instability. However, it may be difficult transitioning back to a field-oriented role. Time (as familiar technologies change) or simple external perception can limit the manager's options for returning to a technical role. **What do you want?** Remember to maintain your technical knowledge to maximize your options.

If you do become a boss, you'll notice subordinates are suddenly attentive to every word you say. Don't fall into the trap that you are automatically more knowledgeable about the subject matter or a better geologist. Remember, leadership is largely a lifestyle choice and is not always paired with the requisite talent or experience. Good supervisors surround themselves with subject-matter experts. Therefore, your fresh insight is very valuable. Your ideas can influence the decisions of your supervisor, if those ideas are communicated well and backed by good science.

A new geologist isn't expected to be a Professor of English out of school, but developing a talent for concise, impactful writing is fundamental to disseminating your ideas and to career advancement. Clear writing sometimes is overlooked in the sciences. Geologists particularly love big words, where plain language might broaden their audience.

Throughout your career you will be faced with changing technology, whether applied personally or by the people you manage. Just as you shouldn't discard the effective methods of the past, don't stagnate intellectually. Dogged application of the slide rule isn't what advanced the profession of our colleague the engineer. You don't need to know the intimate details of every new tool that enters your general field of specialization, excluding those that you utilize in your own role, but it's valuable to understand their potential risks and benefits at a broad level. Continued learning will assist you in choosing best practices among tried methodologies and new technology. Typically, solutions are a combination of the two. Postgraduate courses or seminars also help bridge the recently widening knowledge gap resulting from diluted, nontraditional earth systems degrees.

Technology shouldn't be a crutch for intellectual laziness and displace critical thinking in the field, so remember to apply your geologic sense. Too often, for

example, complexly-embayed or rib-like outcrops are represented

on factual geologic maps as amoeboid ovals. Downloading GPS waypoints from an easy walk around the outcrop and generating base maps on the office GIS platform will never replace careful field observations. The geologist's role – in almost any context – is fundamentally building models. These models will always be imperfect. Those done through shortcuts will be more imperfect.

Interpretive models are never fully complete and should be challenged at all major decision points. In particular, don't blindly rely on the previous ( $n + 2$ ) interpretations of  $n$  project geologists. A geologist who is newly responsible for an established study area should re-evaluate historic factual data and ensure "one voice" in interpretation. A unified interpretation by you or a small, calibrated team may prove to be wrong, but at least it will be consistently wrong, and a batch correction can be applied. Reserves of core or drill chips are like books that should be re-read by a new project geologist, for example. This can be a big job, one which I've observed some geologists are averse to, but it's often more cost effective than collecting new data. However, never discard the previous work of others. Their work may be needed and helpful someday to refine your own.

Consider the economics of your chosen career specialization. For instance, the customer of a process mineralogist doesn't care about the genetic origins of the rocks or the geologic history, but instead focus on the physical properties and proportions of mineral grains in concentrate or whole-rock that impact a specific process flowsheet or product. Jobs are based on what the world needs, and there are more career opportunities for high-demand niches of the profession, where there is a demand for skills but there isn't a ready supply of trained geologists. If you're hoping to be a practicing paleontologist or want a career in pure research, you'd better be the best. Happily, while your passions may not always align with your responsibilities, there is such a thing as free time.

Know the ultimate customer of your department or firm. He or she is probably not a geologist, and is likely to be an engineer if you work in industry. Consider avoiding the age-old rivalry between geologists and engineers,

even in jest. Give respect to other professional disciplines and expect it in return. But what your boss or the customer loves, you should at least like. Therefore, speak the

language of mathematics. If you seek a career in industry, but your coursework does not include the full complement of math curriculum through advanced calculus, then supplement it. Geology is not separate from its governing physical processes, nor should geologists distance themselves from those who apply them. Even gentle antagonism with other professions leads to gaps where “it’s not my job.” Too often, for example, the geotechnical field is neglected as “engineering” by geologists or “geology” by engineers, when in fact the geologist should be interested in all physical characteristics of rocks and the engineer in how to manipulate these characteristics. There has been recent crossover success with the evolution of geometallurgy, in part due to geologists who (with mineral processing colleagues) saw a similar interdisciplinary gap and filled it.

Present yourself appropriately for the environment. We are justly proud of the tangible symbols of a geologist—the compass, the rock hammer, the hand lens. But I know of no other profession where some practitioners so stubbornly shout out their affiliation in every setting. Medical doctors don’t wear lab coats to conferences. Determinedly sporting a faded field vest and blue jeans, with hand lens prominently displayed on a loop about your neck, is probably not appropriate for the boardroom. A key to any career is building relationships, not building an island. We establish our credentials and respect for the profession through competent application of professional tools and knowledge, not a display of totems to non-geologists who don’t care.

It’s not enough to be passionate about learning the science and practice of geology. As well as a professional geologist’s license, today you need to cultivate personal tools for a **social license** to operate. You must evaluate the implications for safety, environment, and community – beyond the minimum regulatory requirements – for all you do. Social license advocacy may even be a central societal value of the role for geologists in the environmental field. The social and professional licenses intersect at ethics and should never conflict. The dynamic aspects of social license work can outwardly appear tedious and are frequently challenging compared with

the relative familiarity and pleasure of geologic practice, but if you aren’t committed to help build a strong relationship between your organization and community, there may be no **opportunity** to practice geology.

Be willing to utilize the principles of exploration and inquisitiveness you’ve learned to all tasks to which you employ yourself. Geologists can explore data, and not necessarily geological data, as well as rocks. Our ability to apply three-dimensional critical thinking and interpretation in an extra-geological context is a powerful tool that, when exercised, can enhance the value of a geologist to any organization. A summary of what makes a successful career in geology would likely parallel one given by professionals in any other field – it’s largely about developing meaningful relationships of mutual respect as well as core skills. If you have built a working relationship with an experienced mentor geologist, treasure it. If you don’t, AIPG and other industry organizations are good places to find one.

So the future is yours to make. If asked, mentors will help guide you around the pitfalls they’ve had to navigate in their own early careers. And, professional geologists are important contributors to society, even if society doesn’t always recognize it.

Michael Orobona, CPG-11099, graduated from Colorado School of Mines with a B.Sc. in Geological Engineering in 1991, and he completed a M.Sc. in Geological Sciences from Queen’s University in 1996. Between 1991 and 2002, he was employed by Newmont Mining Corporation on gold exploration and mine geology projects in Nevada and the Northwest U.S. He joined Cliffs Natural Resources in 2003, where he currently works as Principal Geologist, following mine-site and corporate roles supporting North American iron ore operations and in management of nickel, copper, and direct-shipping iron exploration projects in British Columbia, Mexico and Western Australia. He is currently on the advisory board of the Mineral Exploration Research Centre (MERC) and a Mentor for the Society of Economic Geologists.



## 'Recruit, Recruit, then Retain, Retain ...'

### Community Colleges Should Recruit Geo Majors

**Barry Friedman**

**American Association of Petroleum Geologists**



Image Credit: AAPG

Robert Gray is a man on a mission. Gray, an AAPG Grover E. Murray Distinguished Geology Educator Award winner in 2014, said he is tired of lower-level geologic study at community and city college levels being treated like the Rodney Dangerfield of academia.

"We're all well aware," this professor of earth science at Santa Barbara City College said, "that large major 'research' universities require the tenured geologic professors to focus on research with the aid of graduate geo-majors (who get financial assistance from the research work)."

What they miss, he wants you to know, is often the student.

"Without the threat of Publish or Perish," Gray said of SBCC – but he includes other city and community colleges as well – "we can focus more on the freshman and sophomore students. We have time to counsel them more thoroughly and to push them out to the university of their choice. "Our whole geology program is centered around 'geology in the field.'"

### Ahead of the Curve

It's a case of quality and quantity – and it works not only for students, but also, ultimately, for the industry.

"Over the years I have received emails and, in the past, letters from our geo-majors who have gone on to universities extolling their achievements at the junior and senior level, because they were way ahead of their classmates who had taken the freshman and sophomore courses at the university."

And here Gray makes a bold claim.

"I'm not sure that the universities really care about the freshman/sophomore classes."

An overstatement, maybe, but in those letters and emails, Gray said, his graduates are thankful for not only

the kind of courses they took at SBCC, but the environment at the school as well.

"They feel that they are better equipped and more focused than their similar geomajors who came up through the university program."

This nurturing process, though, begins even before the student gets to college – any college.

Gray said that very few geology majors are born that way and the courses that might excite them have much to be desired.

"Many earth sciences courses at the high school level are perceived as 'easy' natural sciences courses for the non-natural scientists majors," he said.

This continues in what he calls the "rocks for jocks" courses in high schools, which are an easy-out for students who need to take a natural science course.

"Unfortunately, high school counselors often promote the earth sciences courses for less-academically inclined students," he said.

The problem is exacerbated once the student enters college.

"The geoscience programs at some of the most prestigious major universities focus almost entirely on the graduate geology programs," he said. "Little interest is shown in recruiting freshman geology students."

### Fixing the Pipeline

Which is where, he believes, the community college can excel, where this recruitment and encouragement can take form. He believes the success of a community college program should be measured in attracting geo-majors. This way, there will be a link to either an upper-division geology program at a four-year university or to a geo-technician program leading to work in industry.

"In our case (at Santa Barbara Community College), we had both going from 1975 to 1987 until the petroleum industry in Ventura, California collapsed."

He feels it behooves a) community college geology professors to focus on such recruitment, and b) the industry and associations like AAPG to recognize and encourage those efforts.

"So I'm only asking that AAPG or any other geology organization occasionally include the community colleges for their role in recruiting geology majors," he said.

"I really think that many major universities never explain that some or perhaps many of their geo-majors came through the community colleges."

In conclusion, he said, community colleges that have good geo-majors programs are a better place to get early training for students than bigger schools.

"There is more flexibility to mix and match classes at a community college than at the university in this early-going stage."

His goal, he reiterates, is not to knock what's going on at the bigger schools, especially when it comes to research, which admittedly and obviously is something at which the smaller schools cannot compete. What he wants from industry – and this is important to him – is for the profession to remember and acknowledge how vital the role of community college geology department and their geo-majors are.

"Our motto is to recruit, recruit, then retain, retain and foster a collegiate approach to all of our geo-majors," he said.

In fact, at Santa Barbara, over its 48-year history, more than 800 geologists have gone into industry.

It works.

"We're proud of that accomplishment."

## Geoscience Career Master's Preparation Survey - Final Results

**Heather Houlton**

**American Geosciences Institute**

The American Geosciences Institute (AGI) and the Association of American Geographers (AAG) conducted a research study funded by the National Science Foundation (grant 1202707), from November 2013 through August 2014, surveying Geology and Geography non-PhD preparatory Master's degree programs. The study, titled "Geoscience Career Master's Preparation Survey" (Geo Career MaPS) sampled faculty and students from 32 different geology and 42 different geography departments. Geo Career MaPS investigated the different skills and competencies faculty teach their Master's candidates, asked students about what skills and competencies they've gained in their programs, and compared these to what non-academic professionals indicate

as the most important competencies in their careers within the workforce. Heather Houlton (AGI, Principal Investigator), Michael Solem (AAG, Co-PI), Jamie Ricci (AGI, Intern Researcher) and Candice Luebbering (AAG, Researcher) led the research.

One of the first studies of its kind, Geo Career MaPS serves as a pilot to understand how faculty train Master's candidates for employment outside of academia. This is an important question to the geoscience community because traditionally the Master's degree is considered the "professional" degree, although recent anecdotal evidence suggests employment opportunities outside of academia are increasing for Bachelor's degree recipients.

In addition to investigating competencies taught and learned in Master's programs, the research team inquired about more general questions such as why students enrolled in a graduate program, what students' career choices and influences are, and how satisfied faculty and students are with the degree programs. Results of the study are being published as a series of AGI's Geoscience Currents (numbers 97-103). These results will also be displayed on AGI's workforce webpage as an informal report which can be found here: <http://www.americangeosciences.org/workforce/geo-career-maps>.

Informed by the results from Geo Career MaPS, AGI will be developing career resources for faculty, administration and students to address some of the deficiencies found in Master's degree programs. If you are interested in learning more about these materials, or have suggestions and ideas about what would be helpful for your department, please contact the Principal Investigator Heather Houlton at [hhrh@americangeosciences.org](mailto:hhrh@americangeosciences.org).

## Ten Years and a Million Lessons

**Keri A. nutter, CPG-11579**

**American Institute of Professional Geologists**

For the 2014 National Conference in Prescott, Arizona, President Talkington asked me to present during the Young Professionals technical session. I wasn't really sure what to discuss; I don't really conduct any research, and I wasn't really sure that I could fill 20 minutes with even one of my more exciting projects. But then I got to thinking about my audience: what do I wish I had known when I started working? How did I get to where

I was? How could my first 10 years of experience as a professional help others prepare for their own career?

When I graduated college in 2004, I really and truly thought I knew what I wanted to do. I had wanted to be a geologist since high school, and all through college had carefully selected my courses to complement my interests. Of course, as graduation approached, I needed to find a job. With my heart set on natural hazard assessment, I quickly realized that fresh-off-the-stage graduates can't be too picky in the job search— you kinda take what you can get and hope it somehow relates to your field.

About a week or so before graduation, I applied to an engineering firm's ad in my hometown paper for a geologist and a geotechnical engineer. Both job descriptions required an understanding of geological processes: check. Both required field time— isn't that what I had been training for? And both were in the geotechnical engineering department. At the time, I didn't know what a geotechnical engineer\* was, but I needed a job and soon, so I applied for both positions.

I received a call back and had my interview the day after I returned home from graduating college. It was an interesting experience and I must have been really nervous, because I don't remember the interview. I remember stressing over how to dress for a professional job interview, but still maintain the image of a serious field geologist when wearing business casual attire. (I have since learned that geologists can wear wingtips or heels in the office, but still rock steel toes in the field. We're versatile that way.)

The interview must have gone well (enough) and I was offered the position as DOWL's newest geologist! My first two weeks were spent in the soils testing laboratory, shaking sieves and running Atterberg Limits tests. They had me classifying soil using the Unified Soil Classification System (USCS) system (where as I was classically trained on the USDA system) and there was not a single rock to be found. Where were all the rocks?!

Two weeks later, management decided I had enough lab training to start learning the fieldwork — turns out this was just more soil classification, but done outside, in smaller quantities, and with drillers yelling at me to hurry up! The work was tedious and repetitive, but at least my outdoor office had a great view. Still no rocks, though.

About a month into my new job, my manager asked me to join her on a trip for pile load-testing in Akiachak, a small village upriver from Bethel. I was going to get to go to a village and learn something new with my boss, who is a pretty amazing engineer. I was thrilled! We took the jet to Bethel, and then chartered a small plane to a village with a single,

3,300-foot gravel runway. We had to walk a short distance from the airport to the school site, where hundreds of driven steel pipe piles had been installed. My boss Maria may have taught me how to do the static pile load test that day, but what I remember most is the interaction she had with the pile driving contractor, the client, and the inspector.

It was this short day trip to a small village and seemingly simple school site that made me realize just how important the work I do is. The information that I obtain in the field is the basis of the foundation design and ultimate performance of a building, or road, or tower, or whatever development I am working on. Some of the buildings, such as this school, or the airport runway, are essential to a community like Akiachak and serve as more than their named purpose. A village school, for example, is the community center, emergency shelter, and occasional clinic, as well as an education facility. And if their expensive new building doesn't perform the way it should, the community as a whole suffers.

And it all clicked for me. I then felt like I was part of something important and that the work I was doing meant something. And even though I have (almost) always found my job fun, I like that it is relevant to our daily lives; people depend on this information, and my scientific background and understanding of geological processes is crucial to assisting the engineers.

Since that moment 10 years ago, I have been to more than 60 communities (several of them multiple times for multiple weeks), drilled about 300 projects across Alaska, and been to almost all four "corners" of Alaska (Ketchikan, Barrow, St. Lawrence Island and Cold Bay). And I still want to do it!

I did eventually get to practice some hard rock geology and have had the opportunities to teach engineers about glacial geology, various soil deposition environments, and the importance of geology to the engineering and design of their project. I have also assisted our



materials testing laboratory to develop armor rock testing by identifying the rock samples that clients submit.

I started my career as a staff geologist, but I accepted every challenge I could and found my niche. I did my time in the villages by sleeping on an air mattress on the gym floor, pulling 14 to 16 hour days in inclement weather, and working nights and weekends to meet a deadline. I said “yes” and asked questions, and by realizing that I didn’t know everything but could try anything, I have made geotechnical engineering my career. That is all it took for me to grow personally and professionally, and to gain the experience and tenure to earn a chance at working in awesome project locations.

Now, I am a professional geologist with my CPG and I am leading the geotechnical engineering department that I joined 10 years ago. I have surrounded myself with smart, positive, capable people that share the same goals for projects and clients as I. I have advanced in my career, had a family, and participated in professional organizations. How did I do it? I just pressed on and accepted the projects that came to me, regardless of how pleasant or unpleasant the work or location was. Creating and maintaining a support network in my company, but also with professional organizations like AIPG, helped me find like-minded individuals with similar experiences and challenges, and advice about how to turn those challenges into triumphs.

My company has provided me opportunities and allowed me to create my own. I love Alaska, and DOWL has paid me to visit places in Alaska that others save for their whole lives to visit. I drive around Anchorage and can point out to my kids the buildings I have helped design—buildings in which they might shop, live, and work if they stay here. And the atmosphere at DOWL is open and friendly—I have gotten to know many good people with interesting things to talk about and made some life-long friends.

When it comes down to it, I made the job I got into the job I love. All it took was the right attitude and enthusiasm for even the most mundane task to succeed at any job. I had to realize, and you will too, that it won’t always be 60 degrees and sunny, and to prepare for cold, rain, and snow, both physically and metaphorically. Everyone has to take on some unpleasant projects to earn a shot at the amazing ones. We all have to enter the profession

knowing that we need to earn our experience, worth, and place. No one knows it all, especially right out of school – your classes prepared you for the technical, but once you start your career, embrace the opportunity to turn the office and field into your classroom to learn the practical aspects of your profession. Don’t be afraid of the uncomfortable and new experiences, because they will lead to more experiences and you will be that much more comfortable accepting the next challenge.

You will make mistakes, and probably at least one big one; if you don’t, you’re not stretching yourself. Learn from your mistakes, and listen to the advice of others. Be polite, respectful, and humble, but remain confident in your abilities. Realize that the opportunities are there and if you can just say yes to at least one, more will follow. If there is one thing that you can start off your career with and carry on through with you, is to just say “yes!”

*\*Geotechnical engineering is the subdiscipline of civil engineering that involves natural materials found close to the surface of the earth. It includes the application of the principles of soil mechanics and rock mechanics to the design of foundations, retaining structures, and earth structures (Braja M. Das, Principles of Geotechnical Engineering, Third Edition).*

Keri Nutter, CPG-11579, (knutter@dowl.com) is a Certified Professional Geologist in the State of Alaska. Over the past 10 years, she has travelled all over Alaska completing geotechnical investigation for DOWL, a local engineering consulting firm. She is currently serving as the AIPG Alaska Section Vice President and as an Advisory Board Representative of the AIPG National Executive Committee.

## “Pouring My Cup into Yours” or What to Expect in Your Career

**Wayne Hamilton, CPG-06833**

**American Institute of Professional Geologists**

Thirty-four years ago, I was wondering what the “real world” would be like and what my first job might be. Now that I’ve retired from Shell Oil Company, my thirty-four years of geological and environmental experience has produced many lessons I’d like to share with students who are starting a professional career. These are things I’ve learned over the course of my career that will help you enhance your career so you’ll be all you can be.

## Lessons Learned

- It takes about **nine months** to understand a new job and contribute in a meaningful way. Be patient, but work hard. The nine month rule-of-thumb is needed to understand the people, processes, and organization and then you'll add value.
- Develop your career with a **blend of office and field work**. In particular understand the operations that you are supporting. As a consultant or employee, what problem are you trying to help your client or customer solve? For example, it might be a company issue or regulatory compliance, but understand the technical requirements and how they are carried out in the field. My early mentor recommended two weeks in the office and one week in the field. A good rule of thumb to apply field learning in the office.
- **Be an expert**, the "go to person." Develop a reputation as the person to ask about a particular technical subject. Air, groundwater, reclamation, geotechnical, soils, assessment, restoration, etc. Keep aware of current applications and thinking in your favorite practice area. One way to develop expertise is become a journal editor. You learn from reading technical articles and get feedback from the lead editor.
- **Support your team**. Most consulting and operations requires you to work with a diversity of disciplines. So reply quickly to email. Give easily understood answers to those outside your field. Don't try to impress with technical jargon, it is the simple and clearly articulated answers that get you a pay raise or promotion
- Greatest **opportunities are between the disciplines**. For example, understand the legal, land, safety, and engineering fields. Those who can apply their trade to other disciplines and help them solve their issues or make better decisions are those who will grow in their profession.
- Learn how to **sell an idea**. We all sell constantly, even though as geologists we desire decisions based on the scientific approach. But too often I've seen good ideas die because the person did not possess the writing and verbal skills to sell their recommended direction. Become involved in groups like Toastmasters to improve your speaking and leadership skills. Learning to convey and sell ideas will pay out, over and over again.
- **Information technology** has changed dramatically in 34 years. It will continue to change, so **invest in yourself** and buy quality computers, phones, pads and learn how to use them. Understanding and staying current with technology will make you more efficient and effective.
- **Learn personal finance**. Your generation will probably not have pension programs. But no generation has had guarantees. So don't worry about that. Learn about personal investing in mutual funds, IRA, 401K, and all the saving programs. Learn how to take care of yourself financially. I've mentored many in my company, several with PhDs from the best schools in the country, and not one had an hour of instruction in personal finance. I know you are broke now and money is not on your radar. But learn about personal finance as your career advances.
- Learn to **ride the business waves or cycles**. The oil and gas boom we are in will change. I'm not a prophet, and don't know what the future will bring. So follow the business you are in, the price of the produced product. This also applies to regulators and government workers. I've seen regulators laid off, when industries went away. Be aware of your business surroundings.
- **Blindsided by a sinking business**. Yes, you'll be impacted by several down cycles in your career, and either be asked to leave or forced out. Don't let that make you bitter. You decide on how to respond to business cycles. Learn from what happened, start again, and move on.
- **Globalization is a reality**. My expense statement was processed in India and contractor paid by staff in Malaysia. Don't complain about this, accept that they work cheaper than us, so you'll have to do a better job to get higher pay.

- Get ***certified as a professional***. Even if it costs you money and time, do it. You want professional credentials. Plan to take the required tests and when you have the years of experience become a credentialed professional.
- ***Personal development***. Learn how to speak before an audience and write concisely. Practice working with people and leading. There are a wealth of books and podcasts to help you grow. Start now with free podcasts on speaking, writing, and leading.
- Learn how to ***stand out***. I started learning how to play the guitar and sing when I was 37 years old. I changed words to common songs and sang about the team I was on. This made me known---so do something that fits your skills and competency that makes you standout.
- Start your ***own business***. This is one way to learn a tremendous amount about your field and possibly build wealth for your future. Some of you should be geological entrepreneurs. Start learning now about how the real world functions through your early jobs. Your experiences and training will serve you well if you choose to pursue your own business.

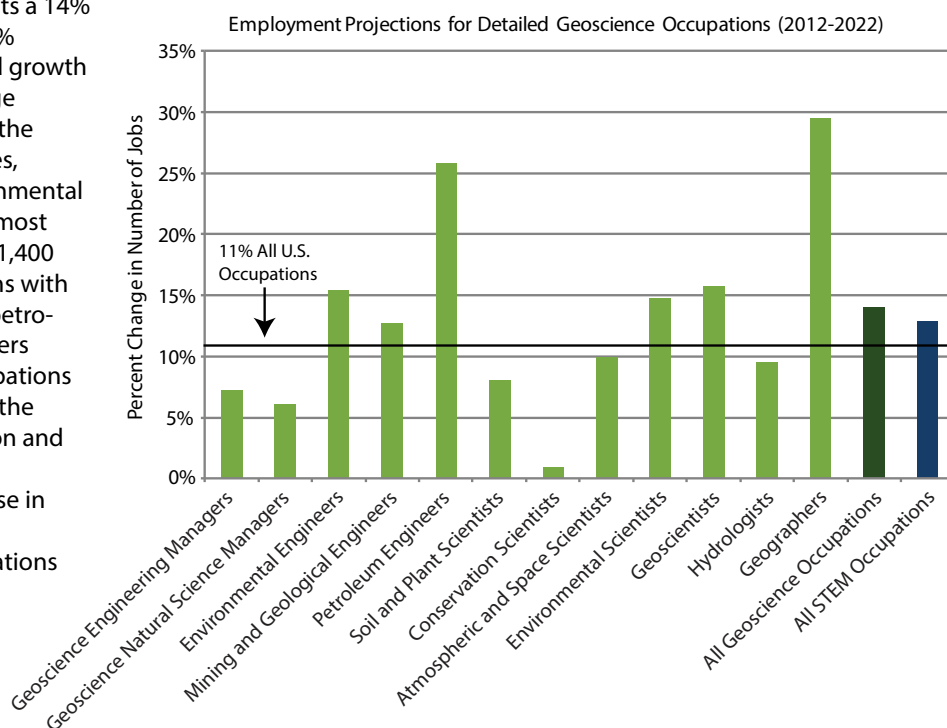
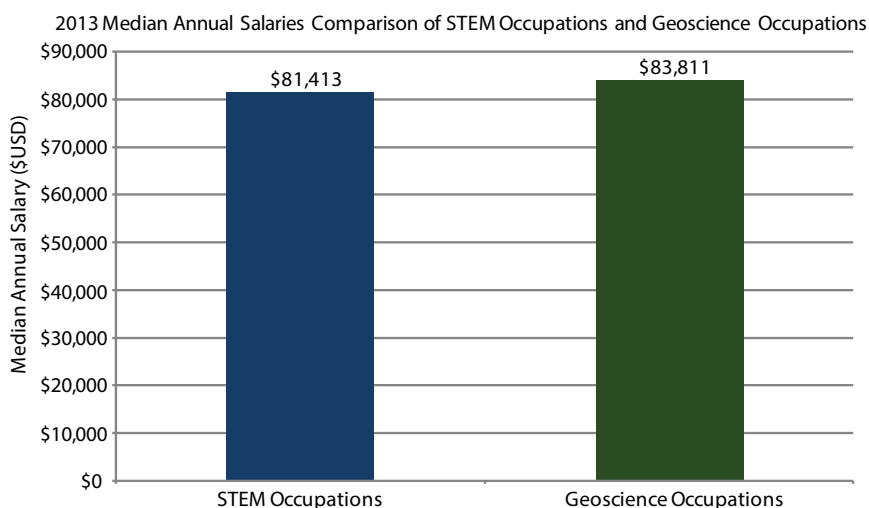


## Comparison of STEM and Geoscience Occupation Growth Over the Next Decade

Recent discussions have focused on the current and future job market for science, technology, engineering, and mathematics (STEM) graduates, and AGI has received multiple requests for comparisons between the geoscience workforce and the STEM workforce.

According to the Bureau of Labor Statistics (BLS), there are approximately 300,000 geoscientists and 8.7 million STEM workers employed in the United States with average median salaries of \$83,811 and \$81,413 respectively. Both annual median salaries are well over the overall annual median salary of \$35,080 in the U.S. workforce.

Over the next decade, the BLS projects a 14% increase in geoscience jobs and a 13% increase in STEM jobs. This predicted growth is a bit higher than the overall average growth of 11% for all occupations in the United States. Within the geosciences, environmental scientists and environmental engineers are predicted to have the most workers, increasing to 103,200 and 61,400 jobs respectively, and the occupations with the greatest increase in jobs will be petroleum engineers (26%) and geographers (29%). Within STEM, computer occupations and engineers are predicted to have the most workers, increasing to 4.3 million and 1.7 million jobs respectively, and the occupations with the greatest increase in jobs will be within the mathematical sciences (26%) and computer occupations (18%).



- Carolyn E. Wilson

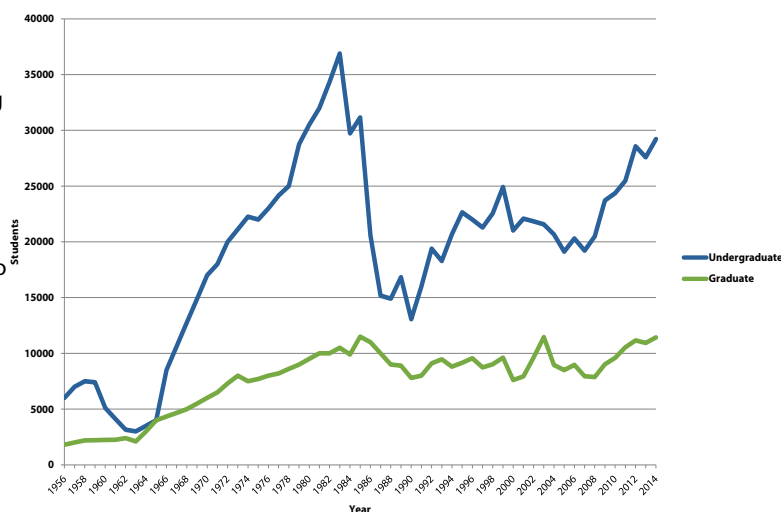
## U.S. Geoscience Enrollments & Degrees Robust in 2014

Enrollments in U.S. geoscience programs remained robust during the 2013-2014 academic year. Enrollments continued its long-term growth trend with 6% and 4.5% increases for undergraduate and graduate enrollments, respectively. The continued growth likely reflects the strong employment outlook for the geosciences relative to the continued weak U.S. job market, though the drop in oil prices in late 2014 may impede some of that near-term growth.

In general, geoscience programs around the U.S. continue to report that they are at, or near, full capacity for students, especially at the graduate level.

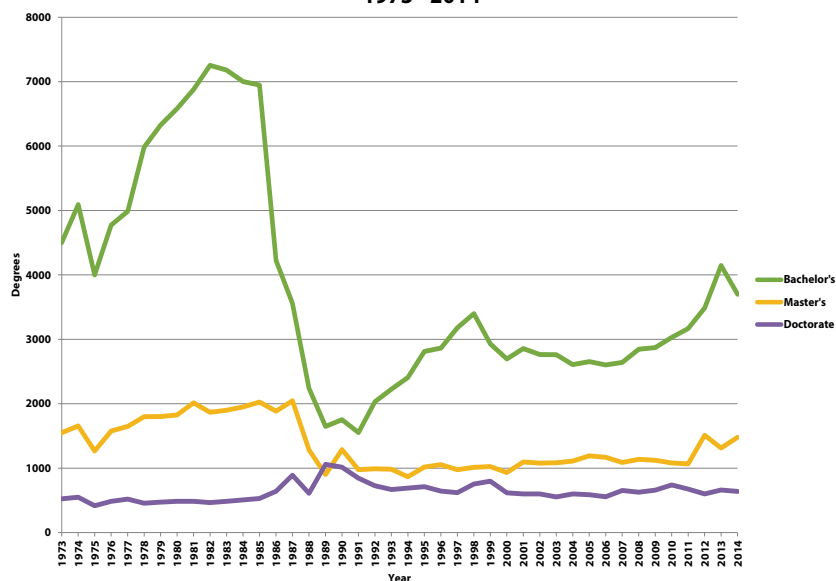
Total enrollments in 2014 were 29,219 undergraduates and 11,433 graduate students.

**US Geoscience Enrollments  
1955 - 2014**



Directory of Geoscience Departments 2015 (AGI)

**US Geoscience Degrees Granted  
1973 - 2014**



Directory of Geoscience Departments 2015 (AGI)

Degree production at U.S. geoscience programs also remained strong. The revised 2013 enrollments showed a surge to over 4000 awarded bachelor degrees. The dip in 2014 is expected to be a reporting artifact as increasing numbers of bachelor degrees are being awarded in December and Summer graduations, and will be reflected in the updated figures for 2014 in our Currents report next year. The sudden increase in master's degrees awarded in 2012 has become persistent with continued strong growth, with some of that growth at the expense of doctoral program enrollments.

The increase in master's degrees is likely in response to the strong job market, with an increasing number of students pursuing geoscience graduate degrees to improve their employability. More reports are being made by geoscience programs that students in graduate school are opting to exit with a master's even though their original intent was the doctorate.

The total degrees awarded in 2014: 3700 bachelors, 1480 masters, and 638 doctorates.

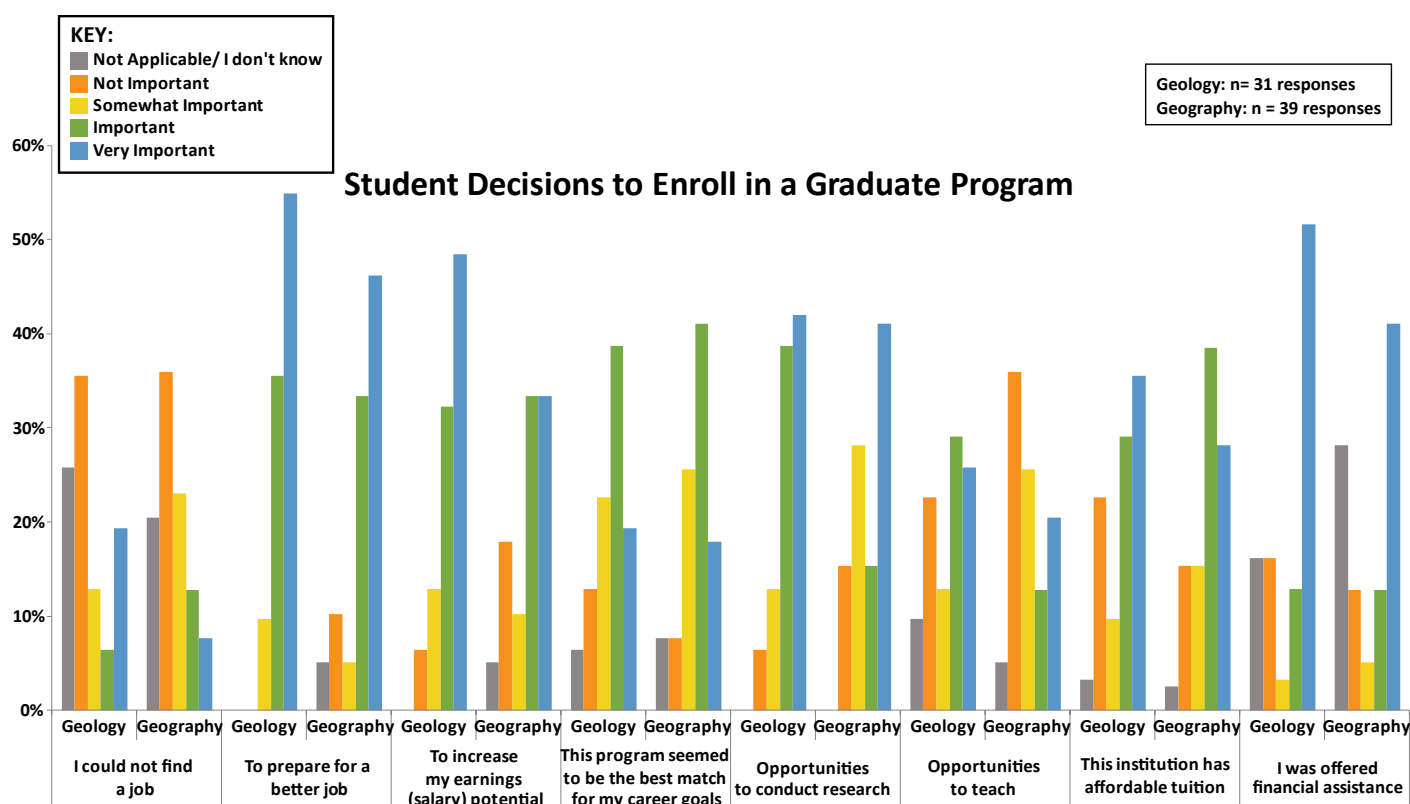
- Christopher M. Keane

## Why Geoscience Students Enroll in a Master's Program

The American Geosciences Institute (AGI) and the Association of American Geographers (AAG) received funding from the National Science Foundation (NSF) to investigate non-doctoral preparatory Master's programs in Geology and physical Geography. The graph below depicts eight commonly identified reasons why students decide to enroll in a Master's program. The majority of students in both Geology and Geography programs, 90% and 80% respectively, indicate that enrolling in a graduate program is "Important" or "Very Important" to prepare for a better job, and in turn, increase salary potential, 81% and 67% respectively. The majority of Geology and Geography students (81% and 56% respectively) also indicate that the opportunities to conduct research are "Important" or "Very Important." Interestingly, the opportunities to teach during a graduate program seem less important, to geography students in particular (62%), with the majority indicating this being "Not Important" or "Somewhat Important."

Data were collected through a study titled Geoscience Career Master's Preparation Survey (Geo Career MaPS), which sought to understand what skills and competencies faculty teach students in Master's programs, how prepared students feel they are in each of these skills, and compare these to what practicing, non-academic geoscience professionals indicate as most important in their fields. The survey also inquired about other items including reasons students enrolled in a graduate program, career choices and influences, and satisfaction with Master's programs. Data were collected from over 20 different Geology departments and over 20 different Geography departments.

This is the first in a series of seven Currents disseminating results from the AGI and AAG Geoscience Career Master's Preparation Survey. For more information about this research, its outcomes and resources available to departments, please visit AGI's website: <http://www.americangeosciences.org/workforce/workforce-readiness>.



Funded by the National Science  
Foundation (Grant #1202707)

Heather Houlton & Jamie Ricci

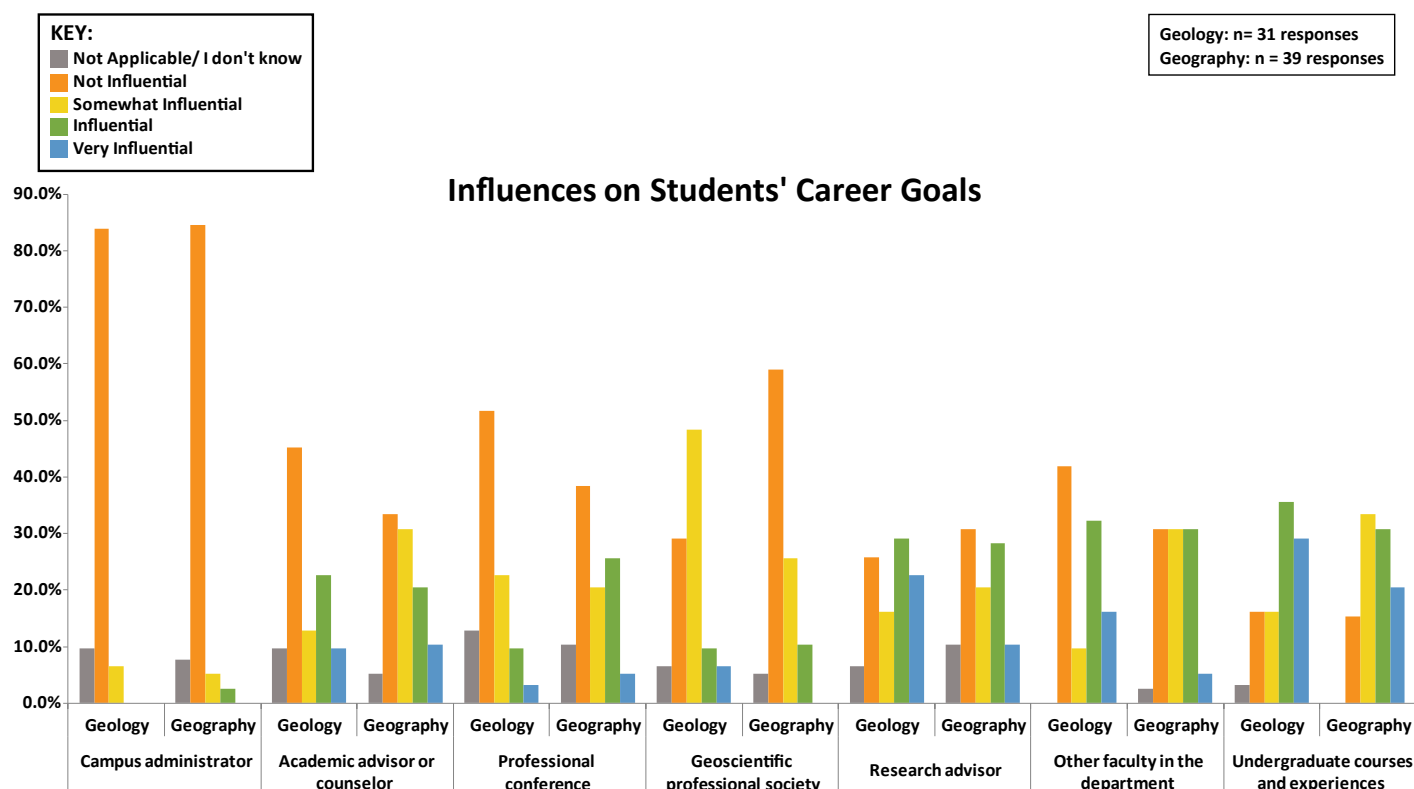


## Influences on Geoscience Master's Students' Career Goals

The Geoscience Career Master's Preparation Survey by AGI and AAG inquired about Master's students' career goals and what influenced those goals. Looking across Geology programs, some students' most common career goals include working in the private sector, in teaching, education or diversity, and aspiring towards management positions. In Geography departments, Master's students are looking to pursue teaching or education careers, work in the GIS field, or pursue industry careers in general.

The graph below shows what students indicate as the most (or least) influential items regarding some of these cited career goals. Geoscience undergraduate courses (65% and 51%) appear to be the dominant influence (including "Influential" and "Very Influential") on Master's students' career goals in Geology and Geography, respectively. Research advisors in Geology (52%) also had quite a positive influence, whereas in Geography, they were not as influential (39% being "Influential" or "Very Influential"), but are clearly still important for geographers. Campus administrators have very little influence on students' career goals (84% and 85% being "Not Influential" in Geology and Geography, respectively). Similarly, academic counselors (58% and 64%) and professional societies (77% and 85%) also have little influence (including "Not Influential" and "Somewhat Influential") on students' specific career goals in Geology and Geography, respectively.

This is the second in a series of seven Currents disseminating results from the AGI and AAG Geoscience Career Master's Preparation Survey. For more information about this research, its outcomes and resources available to departments, please visit AGI's website: <http://www.americangeosciences.org/workforce/workforce-readiness>.

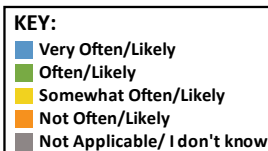


Funded by the National Science  
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Heather Houlton & Jamie Ricci

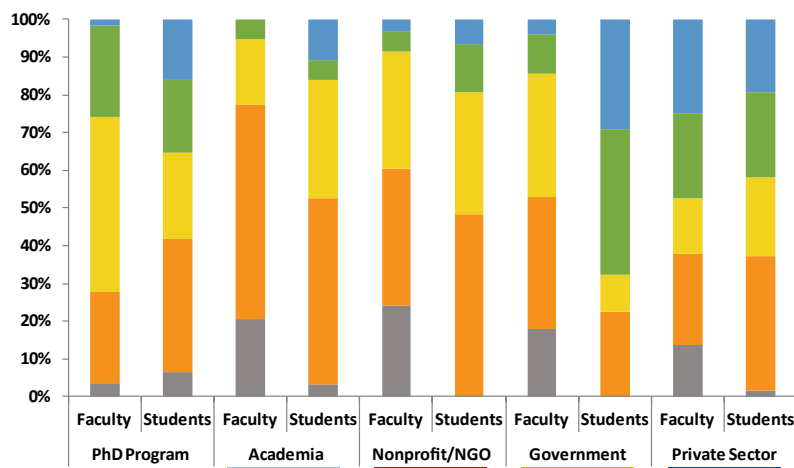
## What Types of Positions are Master's Students Pursuing?

AGI's and AAG's survey asked faculty **how often** their Master's advisees in Geology or Geography programs secure different types of positions post graduation. Students were asked **how likely** they were to consider these career choices. Non-academic professionals, whose highest degrees are Master's, were asked which best describes their current positions. Academia includes employment within K-12, 2-Year colleges or 4-year institutions, government positions include local, state, tribal or federal and the private sector includes industry or self-employment.

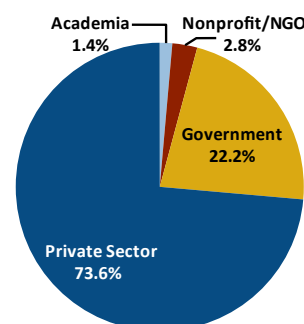


Over 70% of non-academic geologists are employed within the private sector, whereas less than 14% of non-academic geographers are employed within the private sector. Over 40% of geographers have secured employment in a government position. This is compared to only 22% of geologists who are employed within the government. Both Geology and Geography Master's students hope to secure positions in government, with over 67% and nearly 75%, respectively, indicating "Likely" or "Very Likely."

### Geology Positions

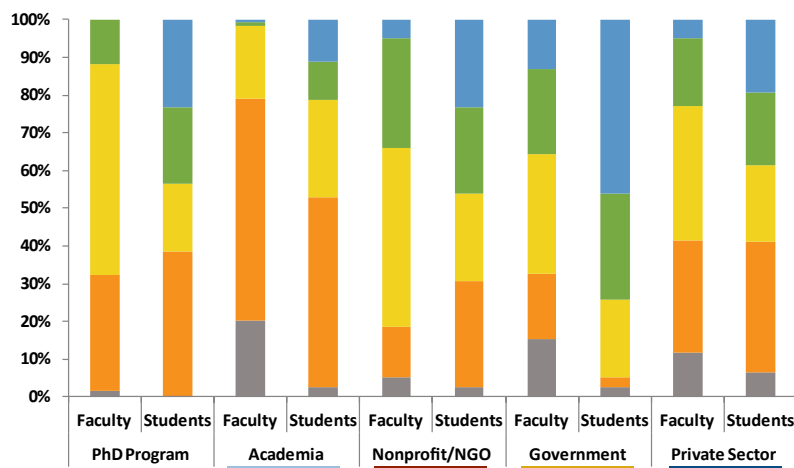


### Geology Professionals' Positions

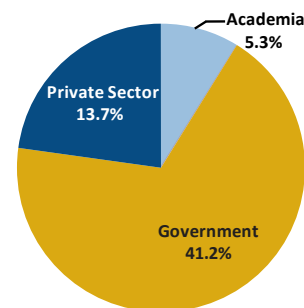


Geology Faculty: n = 58  
Geology Students: n = 31  
Geology Professionals: n = 72

### Geography Positions



### Geography Professionals' Positions



Geography Faculty: n = 59  
Geography Students: n = 39  
Geography Professionals: n = 24

This is the third in a series of seven Currents disseminating results from the AGI and AAG Geoscience Career Master's Preparation Survey. For more information about this research, its outcomes and resources available to departments, please visit AGI's website: <http://www.americangeosciences.org/workforce/workforce-readiness>.

Heather Houlton  
& Jamie Ricci

Funded by the National Science  
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Dr. Ed C. Robeck  
American Geosciences Institute

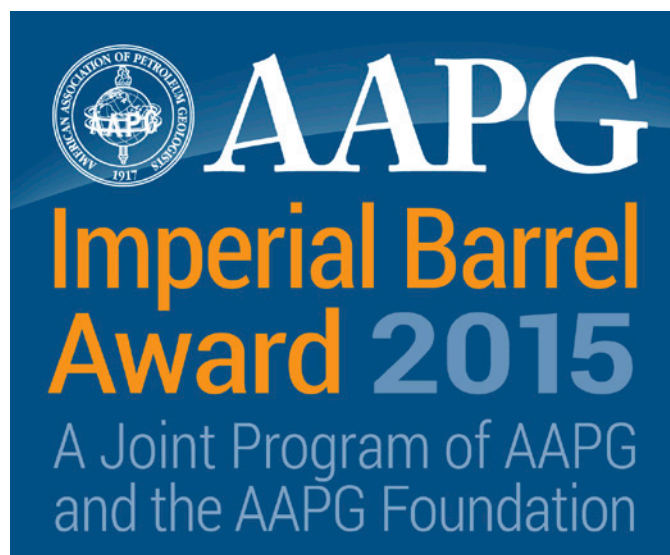
Alexandria, VA - In today's world, topics of climate change and energy resources are central to sustainability and quality of life. AGI's Center for Geoscience and Society is pleased to be a partner with the U.S. Department of Energy and the National Center for Science Education on a public awareness program about energy and climate literacy that was announced today by the White House Office of Science and Technology Policy (OSTP). The OSTP announcement marks the beginning of a climate and energy literacy initiative, which includes many dimensions, including a set of educational videos developed by the partner organizations with partial funding and technical assistance from the Center for Geoscience and Society. Four of the videos are available now, and four more will be released in early 2015. The videos help to communicate principles in the Energy

### Literacy Framework.

- The [OSTP press release](#) provides additional information about the White House initiative.
- The [Energy Literacy Framework](#) is available online at from the U.S. Department of Energy.
- The Essential Principles of Energy videos along with instructional ideas for their use can be found at U.S. Department of Energy [website](#) or the [U.S. Department of Energy YouTube Channel](#).

## Record-Setting Field Ready for IBA Season

By Barry Friedman  
American Association of Petroleum Geologists



The global field has been set for the largest AAPG/AAPG Foundation Imperial Barrel Award competition in the event's history, with contests set to start this month around the world.

The 2015 IBA has attracted 140 teams from nearly 40 countries, representing all of AAPG's Regions and Sections.

The IBA is an annual prospective basin evaluation competition for geoscience graduate students who compete as teams to win scholarship funds for their geoscience departments – plus a lot of recognition and career-enhancing status for themselves by being part of the program.

Each year, university teams analyze a dataset (geology, geophysics, land, production, infrastructure and other relevant materials) for nearly two months in preparation for the semi-final competitions against other teams in their respective Regions or Sections.

The 12 winning teams from this month's events will go on to compete in the finals competition for the Imperial Barrel Award, which will take place May 29-31, just prior to the AAPG Annual Convention and Exhibition in Denver.

The winning team will be announced in a special awards program that is open to all at 3 p.m. Sunday, as a lead-in to the ACE opening session.

The 2014 IBA was won by the University of Louisiana at Lafayette. In winning, the school became the first in the event's history to become a two-time winner of the top prize, its first win coming in 2012.

The school is once again a part of this year's competition, and will compete against 10 other teams for the right to represent the Gulf Coast Section in Denver.

## Tough Times

While IBA is universally applauded as a wonderful opportunity for participating students to gain real-world experience in collaborative work – and to show their efforts to industry experts – this year's competition, like so much of the industry's activities, will be held under and during a dark economic cloud.

It is a trying time. And even with the support of the AAPG Foundation, industry support and sponsorship remain crucial to the IBA's viability.

"The biggest impact on the program this year is the rapid decline in the price of oil and the consequent belt tightening in industry," said AAPG member Charles A. "Chuck" Caughey, a senior adviser with Noble Energy and co-chair with David Cook of the IBA Committee.

That "current economic condition" translates into a more difficult environment in which to obtain the sponsorship required to run an educational program/competition of this nature and scope.

"Many of our loyal sponsors have been unable to contribute this year due to reductions in discretionary spending," Caughey concedes.

As such, the IBA has had to make institutional changes this year to ensure not just fiscal responsibility, but also survival of the program itself.

"In response to the financial situation, a number of measures have been implemented," Cook said, including conducting three of the Regional semi-finals as virtual competitions.

Likewise, the Europe Region, too, has seen a significant cutback in its operation.

"Limited acceptance of applications to the first 20 universities had to be instituted," Cook said, "with the remaining schools encouraged to seek local funding.

"Two universities were able to find sponsorship and will take part in the competition," he added. "Unfortunately this leaves eight universities unable to participate."

Specifically, the economic tightening across the industry means that the datasets on which the schools and students work and are ultimately judged – in other words, the IBAs most integral part – must constantly change.

"We currently have nine active datasets," Cook said. "Universities do not receive the same dataset twice, therefore the IBA Committee is actively seeking new well and seismic datasets for future use.

"Without new datasets," he added, "we will not be able to run the competition in its present form."

Fundraising continues, both Caughey and Cook said, and the committee remains committed to doing all it can to provide a real-world, career-development experience for the students who participate.

## SSSA's International Year of Soils Celebration is in Full Swing!

**Susan Fisk**  
Soil Science Society of America



SSSA's celebration is in full swing! We created 12 monthly themes to help us communicate messages to the public about the value of

soils. Upcoming themes include March's Soils Support Agriculture, April's Soils Clean and Capture Water, and May's Soils Support Buildings and Infrastructure.

We all have a valuable role in communicating vital information on soils, a life sustaining natural resource. Therefore, we want to provide you with resources to learn about soils and help us tell the story of soils! Help us promote #IYS on social media by sharing our posts from Facebook and Twitter!

Check out [www.soils.org/iys](http://www.soils.org/iys) to find monthly activities, videos, stickers, a coloring book and more!

## Travel Awards to Attend the Geological Society of America's (GSA) Annual Meeting through the On To the Future Program (OTF)

Geological Society of America

"Prior to OTF, I was completely clueless on how to even begin pursuing my interests. OTF provided a direction, and I was able to ask questions of the right people. I feel much better about my options academically and professionally!"

~2014 OTF Participant

The On To the Future Program is a national travel award program designed to increase the diversity of the geoscience community by engaging groups traditionally underrepresented in the geosciences at GSA's Annual Meeting. Each year OTF awards partial travel scholarships to undergraduate and graduate students studying in the geosciences to attend their first GSA Annual Meeting.

At the meeting, students are paired with an Annual Meeting mentor who is a professional in the field and assists in nurturing the students' interest in the geosciences. Mentors are a powerful tool meant to help students navigate the meeting and assist students in making informed decisions about a career in the geosciences. Students are also provided with ample opportunities to learn about the various career options available to them after graduation through sector specific career panel discussions. Informal gatherings connect students with key GSA leaders and encourage participation and leadership on GSA's Councils, Committees, Divisions, and Sections.

Established in 2013, the On To the Future Program has helped over 240 students attend their first professional meeting. OTF targets underrepresented students currently studying at two and four year institutions in the

United States and Canada. To learn more or to apply to attend the 2015 Annual Meeting, 1-4 November in Baltimore, MD, visit the On To the Future website (<http://community.geosociety.org/OTF/home/myhome>). Application deadline is May 29.

## GemKids for Schools Turns Students into Rock Stars

**Interactive cross-curricular and standards-based program is free for teachers**

Gemological Institute of America

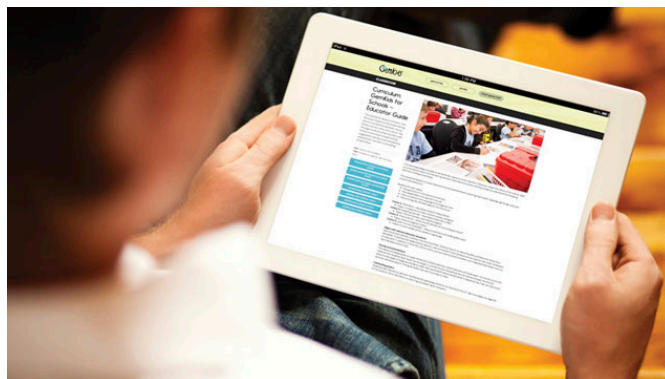


Image Credit: GIA

Third through fifth grade teachers have a new colorful way to engage and excite students about geology, mineralogy and gemology through GIA's new GemKids for Schools curriculum. From volcanoes spewing lava to digging for hidden jewels, students can roll up their sleeves to discover science lessons hidden deep within the Earth. Best of all, this cross-curricular and standards-based program is free to download.

Created by GIA, the global leader in gemological education and research since 1931, GemKids for Schools provides students with big-picture connections between nature, human industry, arts and culture. The program covers how gems are formed in nature, the different methods used to mine them, how civilizations have valued gems throughout history, and much more. By studying gems, students will explore the history of our planet, have more conversations about the intersecting worlds of business and culture, and better understand the changing definitions of beauty and value.

GemKids for Schools is a great way to instill a passion for learning about science and how it connects to



the history of the world. The curriculum is designed to complement existing elementary school Earth science programs and requirements in the U.S. Teachers and parents can find out more by visiting [gemkids.gia.edu/gem/teacher-guide](http://gemkids.gia.edu/gem/teacher-guide). The curriculum is available there to download completely free of charge.

GIA is an 84-year old nonprofit institute dedicated to ensuring the public trust in gems and jewelry through research, education and laboratory services. GemKids for Schools is funded by the GIA endowment, which supports education and scholarship programs.

## InTeGrate Announces New Publication

**Krista Herbstrith**

**National Association of Geoscience Teachers**

Interdisciplinary Teaching about Earth for a Sustainable Future (InTeGrate), a 5-year STEP Center grant from the National Science Foundation, seeks to increase Earth literacy of all undergraduate students, as well as the number of graduates who are prepared to bring an understanding of the Earth to bear on the resource and environmental issues faced by our society today and in the future.

To this end, InTeGrate is pleased to announce the publication of the complete Interactions between Water, Earth's Surface, and Human Activity module on the InTeGrate site: [http://serc.carleton.edu/integrate/teaching\\_materials/modules\\_courses.html](http://serc.carleton.edu/integrate/teaching_materials/modules_courses.html)

Developed by Professor Sue DeBari, Western Washington University, Professor Kyle Gray, University of Northern Iowa, and Professor Julie Monet, California State University-Chico, this two-week teaching module focuses on water and its importance to humans, both as a limited resource and in shaping Earth's surface. Water's flow through the hydrologic cycle is driven by Earth's external energy source – the Sun. Students see that river systems change shape over time, are influenced by climate and by human activity, and affect human activity, for example through flooding. Students develop their understanding while working in small groups, through interaction with simplified physical models of complicated systems, with Google Earth images of stream profiles in different climates, and with real river

flooding data sets. Interactions between Water, Earth's Surface, and Human Activity is a great fit for courses in Earth science, environmental science, water resources, and introductory geoscience.

This module is part of a growing collection of classroom-tested modules and courses developed by InTeGrate. The materials engage students in understanding the Earth system as it intertwines with key societal issues. Prior to publication, this module was successfully used in three different courses at three different institutions. Full materials for faculty support, adoption, and individual notes/stories from pre-publication classroom practice are available to illustrate a full range of teaching environments.

The collection is freely available and ready to be adapted by undergraduate educators across a range of courses including: general education or majors courses in Earth-focused disciplines such as geoscience or environmental science, social science, engineering, and other sciences, as well as courses for interdisciplinary programs.

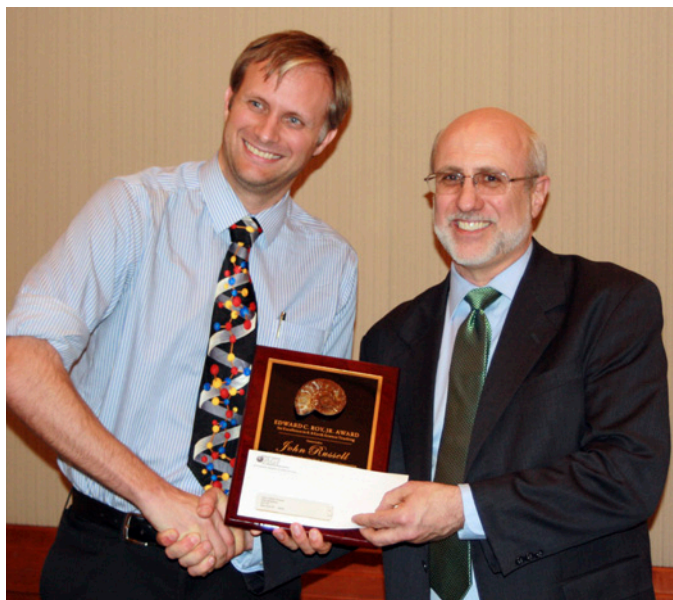
Through the development of these modules, InTeGrate strives to infuse Earth literacy across disciplines, engage younger students in the geosciences, and develop a new vision for how geoscience is positioned in higher education. For more information on InTeGrate, please see our website at <http://serc.carleton.edu/integrate/index.html>

## John Russell to Receive the Edward C. Roy, Jr. Award for Excellence in K-8 Earth Science Teaching

**Laura Rios**

**American Geosciences Institute**

John Russell, a teacher at Columbia Secondary School for Math, Science, and Engineering in New York, NY, has been named the 2015 recipient of the Edward C. Roy, Jr. Award for Excellence in K-8 Earth Science Teaching. Russell, who earned his master's degree in adolescent education from Pace University, has spent his career challenging students in eighth through twelfth grade by integrating research into authentic experiences for students in Earth sciences.



**Mr. John Russell receiving his Edward C. Roy Award at the NSTA Annual Meeting, at the NESTA friends of Earth Science Reception. Image Credit: AGI.**

"Mr. Russell's uses of current research and in-person and historical interviews with scientists allow his students to understand Earth processes and the mechanics of scientific discovery," said AGI Executive Director Dr. P. Patrick Leahy, "This type of instruction not only builds student understanding and personalizes the learning experience, but also fosters workplace skills and builds a lifelong love of Earth Science."

Russell was presented with the award in March at the National Earth Science Teachers Association (NESTA) Friends of Earth Science Reception during the National Science Teachers Association 2015 National Conference in Chicago. Finalists for the award were James Christopher Spiegl of Montgomery Bell Academy in Pegram, TN, and Mary Jean Tykoski of Cooper Junior High School in Wylie, TX.

Given annually, AGI's Edward C. Roy, Jr. Award recognizes one classroom teacher from kindergarten to eighth grade for leadership and innovation in Earth science education. The award is named in honor of Dr. Edward C. Roy, Jr., who was a strong and dedicated supporter of Earth science education. To learn more, please see [www.americangeosciences.org/education/awards/roy](http://www.americangeosciences.org/education/awards/roy).

## Colorado Earth Science Teacher Named Teacher Of The Year

**Susie Moore**

### **American Association of Petroleum Geologists**

Veteran geosciences teacher Jacqueline "Jackie" Bath of Littleton, Colo., a freshman earth sciences teacher at ThunderRidge High School in Highlands Ranch, Colo., has been named the 2015 AAPG Foundation's Teacher of the Year.

Bath, who also teaches geology as an elective to high school juniors and seniors, has been teaching at ThunderRidge for 18 years – and coincidentally, in receiving the honor becomes the 18th recipient.

The annual TOTY honor bestows a \$6,000 prize, which will be split between Bath and ThunderRidge High – \$3,000 to the school for educational uses under Bath's supervision, and to Bath \$3,000 for her personal use.

She also will receive an expense-paid trip to the AAPG Annual Convention and Exhibition in Denver May 31-June 3 where she will be presented with her award at the All-Convention Luncheon.

Of winning the award, Bath said she was excited and honored. "To be recognized as AAPG's Teacher of the Year is truly humbling and I am grateful.

"My career, as an earth science educator has been a journey," Bath said. "My passion for geology and the geosciences provides inspiration to develop activities that actively engage students in meaningful ways."

Bath's students are "actively engaged in learning and applying concepts" through a collaborative classroom environment. She is revered by her colleagues as "innovative," "engaging" and "inspiring."

Reading through her class curriculum and letters of recommendation provide a clue as to why she was nominated: from podcast lectures and interactive tutorials, to simulations, labs and direct exposure to local, regional and global issues, Bath creates a sort of geological utopia, her peers wrote, in which students are encouraged to immerse themselves and make real-world decisions.

A feature story on Bath and her teaching experiences and philosophies will be included in the May EXPLORER.

Bath was one of six TOTY finalists, competing for the prize with teachers who had won top teaching honors in each of the six AAPG Sections. The finalists were all

submitted to a panel of national judges, led by committee chair Laura Zahm.

The five semi-finalists will receive \$500 awards from the AAPG Foundation. They are:

- Sue Boucher (Eastern Section finalist).
- Jennifer Reyes (Gulf Coast Section finalist).
- Katherine Hoover (Southwest Section finalist).
- Shannon Chatwin (Midcontinent Section finalist).
- Stephan Kiouses (Pacific Section finalist).

## Geological Society of America (GSA) GeoCorps America Program - Fall/Winter Opportunities Coming Soon!



GeoCorps America is a program of The Geological Society of America (GSA), partnered with the Bureau of Land Management (BLM), the National Park Service (NPS), and the U.S. Forest Service (USFS). Through GeoCorps America GSA places volunteer

geoscientists from all walks of life in temporary, short-term projects on America's public lands. Participants have the opportunity to conduct fieldwork, interpretation, or research in some of the most stunning natural settings in the United States. In addition they receive a living allowance and housing. In return, the BLM, the NPS, and the USFS gain access to the knowledge and experience of geoscientists to complete resource-management, conservation, research, and education projects that otherwise might not be possible.

GeoCorps advertises projects and accepts applications twice per year; once in the summer, and once in the fall. Fall projects will be available online at the beginning of May, and applications are due at the beginning of July. Visit the GeoCorps America website in May to view a list of the available fall/winter projects and submit your applications. ([www.geosociety.org/geocorps](http://www.geosociety.org/geocorps)) Follow GeoCorps on Facebook year-round to learn about additional geoscience volunteer and employment opportunities. ([www.facebook.com/geocorps](http://www.facebook.com/geocorps))

GeoCorps America projects take place across the United States from Alaska to Florida, and encompass a variety of geoscience related projects. The projects completed at Denali National Park and Preserve during the summer of 2014 represent the scope of GeoCorps projects that take place across the country. Three participants took part in GeoCorps America at Denali National Park and Preserve in 2014. Sasha Leidman, GeoCorps Glacier Monitoring Assistant, focused on tracking ice loss in key glaciers within the park. Sarah Strand, GeoCorps Digital Research Communicator, created a geologic road guide to communicate the geologic history and research taking place at Denali National Park and Preserve to the public. Andrew Collins, GeoCorps Geohazards/GIS Specialist completed inventory, monitoring and assessment of geohazards within the park. Here is a highlight of the work Andrew completed, and the GeoCorps America experience described in Andrew's words.



Photo of Andrew Collins who spent three months at Denali focused on geohazard inventory and assessment. Image Credit: GSA-GeoCorps

### Andrew Collins, Geohazards/GIS Specialist

Andrew Collins spent three months at Denali focused on geohazard inventory and assessment. His work included creating a record of known hazards and hazard areas within the park, studying the Igloo Debris slide which took place in October of 2013, and finally creating a risk assessment and management plan to help mitigate these hazards. This work required data collection in the field, research into new remote data collection equipment, and great attention to detail. Andrew's work with geohazards management helped to keep the park safe and accessible for the staff and visitors.



### GeoCorps, in Andrew's Words:

I discovered in my interactions with both seasonal and permanent staff that Denali and many of its employees have a long history with GeoCorps. Denny was a GeoCorps participant, as was my colleague and 4th-year Physical Science Technician, Maisie. I regularly spent time with three other GeoCorps participants in the park, Sasha, Sarah, and Chelsea, and we were all able to contribute in small ways to each others' projects. I learned that, through this close connection, GeoCorps participants are provided with so many wonderful opportunities, and I tried to take advantage of as many as I could.

Alaska, of course, was an opportunity in and of itself. I came in with experience in remote environments, both temperate and arid, but Alaska took everything to an entirely new level. I learned all about wildlife safety and then got to test my knowledge on a regular basis; I learned more about backpacking, mountaineering, and route-finding than I'd ever taken the time to learn in more accessible, less extreme environments. I gained an appreciation for the immensity of nature and the wilderness, and for the fact that Alaska still has so much of it. My experiences forced me to imagine what other parts of the country and the world might have been like before humans began to exert their heavy-handed influence.

Working at Denali provided me with so much—I can only hope that I gave back a fraction of what I got. I gained valuable experience that I may have never even contemplated had I opted not to leave my small graduate school office for the summer. In addition to all the information I gained from my fieldwork and project, I learned about so much more than geology. Whether by going to staff talks, presentations at the Murie Science and Learning Center, or by just talking to other scientists and participating in other projects, I learned about the work, time, effort, and passion it takes both to know what we know about everything from glacier dynamics to caribou populations, and to keep a park like Denali preserved for the benefit of future generations as well as our own.

## When Teaching Meets Learning: The Role of a TA During the First Year Of Graduate Studies

**Steven M. Battaglia, SA-5246**

**Northern Illinois University**

**American Institute of Professional Geologists**

As a first-year graduate student in your geology department, you may be placed into the position of a teaching assistant (TA). The job(s) of a TA can vary greatly from department to department at different colleges and universities. You may work with an instructor in a lecture course by grading exams and homework assignments, answering student questions via email or during office hours, attending lectures to assist in proctoring exams, or finishing other work the instructor may need throughout the semester. This type of TA position is more "behind the scenes" work for which students will not directly see you in front of the classroom lecturing the course material. Perhaps instead you might be required to instruct a weekly physical geology lab; a single credit hour course that introduces the basic concepts of geology to undergraduate students. This position requires you to be "in the spotlight"—directly in front of your students and lecturing.

Now, imagine this situation for a minute: you just started graduate school without an ounce of teaching experience and are immediately placed in front of a small lab filled with undergraduate students whom are expecting to hear your expertise in the subject. It seems you are required to pick up this "howto-be-a-teacher" thing—and so quickly too! Your first thought is likely to panic. You should NOT panic! You are adept to instruct a group of undergraduates and pass your first semester of graduate coursework at the same time, unscathed, whether you are assisting a professor behind the scenes or in the spotlight instructing your own lab.

I, too, was a first-year TA in graduate school (immediately following undergraduate) and was required to instruct a weekly, one-credit hour physical geology lab. I had to conquer some initial fears right from the start: the pressure of transitioning from undergraduate work to graduate work and teaching undergraduate students at the same time. My supervisors at the time knew that

I was capable of succeeding in this position during my first semester. In the end, I survived (and slightly thrived in my personal opinion), and you will too!

Try to remember this: you were selected (over other graduate students who also applied for an assistantship) by your department's faculty members to be in a TA position for a reason! When you applied to be a teaching assistant, the faculty recognized something in you, beyond just your credentials that made them trust in your competency to instruct an introductory geology laboratory.

I currently have the position of TA Coordinator for the Department of Geology and Environmental Geosciences at NIU. This position requires that I instruct at least one introductory physical geology lab and supervise the remaining TAs who are instructing the other introductory labs in our department. [Disclaimer: I also am under supervision by a designated faculty member from the department!] The TAs that I work with might not have experience teaching a geology lab, or (more likely) may have never taught in their academic career, especially as they enter graduate school for the first time. It is my duty as the TA Coordinator to guide new graduate students in the transition from undergraduate to graduate student with minor, yet significant, teaching responsibilities while simultaneously beginning graduate school.

Here, I will share five pieces of advice which I have found to be extremely helpful, regarding being a first-year graduate TA. I hope at least one of these offers you some perspective on what to expect as you kickoff your new TA position.

- (1) Take time to make your own lab presentations. I place this piece of advice first because I found it to be the most valuable in my graduate school career. When you start as an incoming TA, you may be required to formulate PowerPoint presentations for your weekly lab. Do it! At some point during the semester when you are overloaded with coursework, you may be tempted to ask a former TA for their lectures, but this you should not do. Structuring each of your lab lectures yourself and putting thought into how you would like to present the information will allow you to retain the information more efficiently as you instruct your students. By preparing your own presentations, you also will make subsequent semesters instructing

the same lab easier since you have already formed your presentations and understand the material.

- Be direct with your students about lab structure from day 1. Students should know exactly how the lab is structured from the first day to the end of the semester. You do not want a student to be lost or to misunderstand logistical information. To prevent mishaps, provide as much information on your lab syllabus as possible, including week-to-week topics, exam dates, possible field trip dates, office hours, grades and grading criteria, etc. [This information likely will be provided to you by your faculty supervisor from your department.] Undergraduate students make a common misconception that the TA is there to answer questions at any time of the day. This is completely untrue! You are a student too! Inform your students that you also have regularly scheduled courses and homework, and an immense research project to complete. Be clear that they are welcome and you are open to discuss lab-related topics during lab, during your scheduled office hours, or that you will reply to their emails in a timely manner.
- Be friendly (to an extent) with your students. You do not want to be forever friends with one of your classmates. Do not go grab a beer with one of your students! When a student opens up a conversation, be friendly to them as if you were beginning a conversation with an individual you just met or did not know very well. You want to create an open-ended discussion—classroom environment with set boundaries. Subjected discussions should remain in the science realm that relate to a geology topic. By inviting students to have open-ended discussions with you on related topics (during your structured hours), you will appear more approachable and students may want to open up further discussions with you.
- Be knowledgeable to the best of your ability. Answer a student question to the best of your knowledge. If you do not know an answer, then it is acceptable and wise to reply, "I do not know." Being placed in a teaching role does not indicate you now understand every idea and theory known to exist in geology. Remember

that you are still a student learning and evolving your knowledge. Instead of attempting to answer a student question with a wishywaschy response, you might reply to the student with, "I am not sure of the answer to that question, but perhaps Professor so-and-so may know the answer. Perhaps you should ask him/her during your next lecture. I am interested too, to know how he/she responds."

- Be excited to be teaching geology! You should be enthusiastic teaching the subject that you have found so intriguing over the past few years. You enjoy geology so much that you are further studying the subject in graduate school! No group of students wants to sit through an instruction by a person who does not exhibit some passion for the subject they are teaching—it will resonate poorly with them. Your excitement for geology will show when you take the time to structure your lab's presentations and activities, discuss open-ended concepts with your students, and are knowledgeable to the best of your learning experiences (that you have gained) from your undergraduate education. This will improve the classroom environment.

A final thought: if you have never instructed a course or lab in an academic setting before, then do not fret. Teaching can be one of the most fulfilling experiences for a graduate student. It may open up new opportunities for you outside of conducting research. Putting in the hard work during your first year of graduate school to understand the basics of geology and better explain concepts to a student who has never thought of the Earth as a dynamic planet will greatly increase your knowledge of the subject and, perhaps, inspire others from the next group of undergraduates to do the same.

Steven Battaglia is currently a graduate student at NIU and conducts research in planetary geology. He received a B.S. in Atmospheric Sciences and Geology from the University of Illinois at UrbanaChampaign in 2012.

## InTeGrate Calls for Participation

**Krista Herbstrith**

### **National Association of Geoscience Teachers**

The InTeGrate program is seeking educators to get involved with the program with three new calls for participation.

Apply for Funds to Participate in a Research Project with Your Course - April 17, 2015

InTeGrate is seeking to recruit a team of up to 12 instructors who will participate in a research project to assess the impact of introducing InTeGrate module materials into introductory geoscience or environmental science courses. Accepted participants will receive a stipend of \$5000 per person. Expectations and application materials are available on the InTeGrate website.

Apply for Funds to Develop Teaching Materials or a Model Course - April 30, 2015

Respond to a call for proposals to develop new undergraduate-level teaching modules or model courses. Apply by April 30, 2015

Apply for an Implementation Program Grant - June 30, 2015

Institutions or clusters of institutions, can apply for grants of up to \$50,000 to develop and evaluate innovative programs aimed at 1) increasing the number and diversity of students developing Earth literacy and/or 2) preparing a diverse workforce equipped to bring geosciences to bear in addressing social issues.

## Updates from the AGU Education Program

**Bethany Holm Adamec**

**American Geophysical Union**

### **AGU/AGI Heads and Chairs Webinar Series**

The AGU Heads and Chairs workshop took place on Sunday, 14 December just prior to the Fall Meeting in San Francisco, California and was attended by nearly 50 department heads and chairs. The program included topics such as mentoring faculty, forging academic/industry partnerships, managing faculty, and conducting faculty searches. Please peruse the workshop page and see all the presentations and resources to learn more about the topics discussed. Learn more about the 2015 AGU/AGI Heads and chairs webinar series here. If you



missed any of the 2014 webinars, you can view all the previous recordings.

## **Articles on Education from Eos.org**

Be sure to check out Eos.org, a new, dynamic platform from the American Geophysical Union for Earth and space science news, blogs, opinions, special series, and coverage of the trends influencing our science. The website is open to everyone. See our latest articles about new education events at Fall Meeting 2014, Fall Meeting by the numbers, supporting two- and four-year college students and AGU's virtual poster showcase for undergraduate students.

## **The Latest from the AGU Blogosphere**

Some posts of particular interest to faculty (from GeoEd Trek) include teaching students how to ask for letters of recommendation and the campus common read.

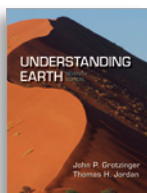
## **New AGU Student Award**

A new grant has been established through the generosity of Geophysical Survey Systems, Inc. (GSSI) in order to support AGU's Near-Surface Geophysics Focus Group's student scientists conducting field geophysical research using Ground-Penetrating Radar (GPR) and Electromagnetic (EM) methods.

Candidates must be actively enrolled in an undergraduate program and have completed at least four semesters towards their degree or be currently enrolled in a graduate program. Applicants must be AGU student members and have designated Near-Surface as one of their AGU affiliations. Applications must include field geophysical research using GPR or EM methods. U.S. citizenship is not a requirement to apply.

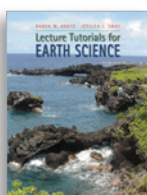
The yearly grant will carry a cash award of up to \$2,000. If funding exists, more than one award may be made in a year. In addition to the cash award, GSSI will make loaner equipment available for the winner(s) to use. Application deadline: 15 March.

# W. H. FREEMAN GEOLOGY 2015



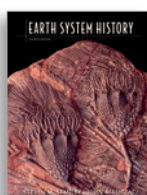
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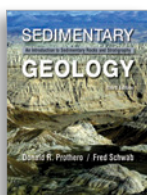
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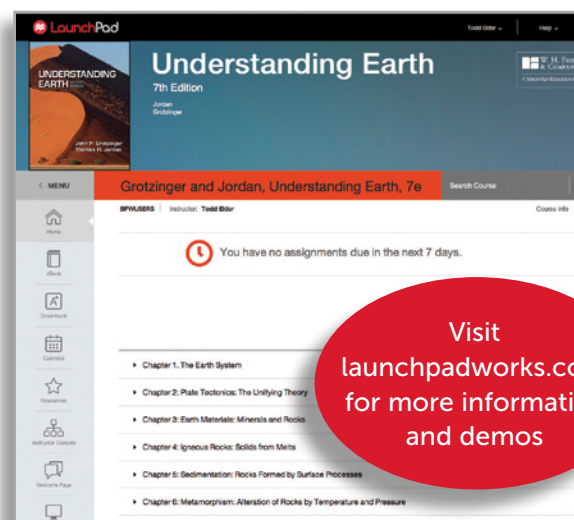


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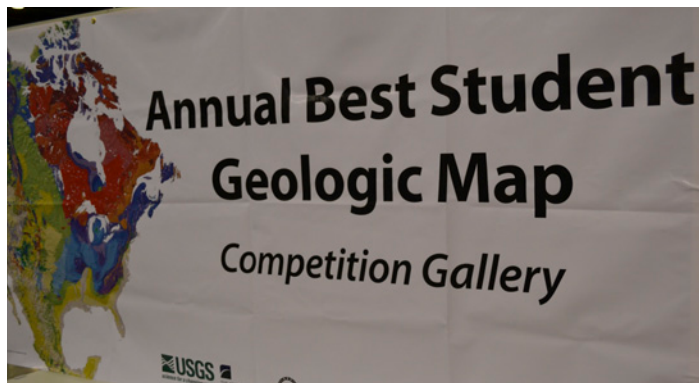
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## Back from the Field - Competing in the Annual Best Student Geologic Map Competition

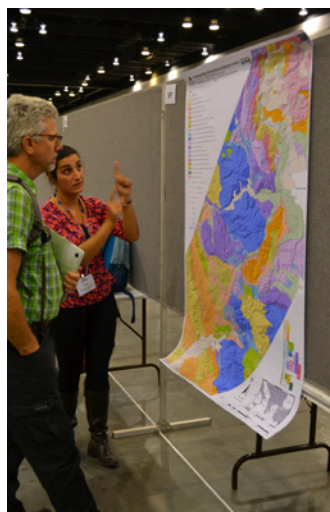
**Maureen Moses**  
**American Geosciences Institute**



Look for these signs at the Poster Session Hall on Tuesday, November 3<sup>rd</sup>, 2015. Image Credit: USGS

The Geological Society of America (GSA) 2016 in Baltimore, Maryland will host the third annual "Best Student Geologic Map Competition. The competition was thought up by Douglas Howard at the U.S. Geological Survey's National Cooperative Geologic Mapping Program, but was brought to life with participation from GSA, the GSA Foundation, the Association of American State Geologists (AASG), the American Institute of Professional Geologists (AIPG), the Journal of Maps, and the American Geosciences Institute (AGI).

"Fieldwork is such an important part of the geoscientists' academic experience," Howard said. "There are people roaming the halls of the USGS, thirty years out of school still reminiscing about their field camp experiences." And for the past few years, statistics tracked by Dr. Penelope Morton at the University of Minnesota Duluth, and AGI have shown that more students are getting the opportunity to participate in field camps around the country (<http://www.americangeosciences.org/workforce/currents/field-camp-attendance-continues-steadily-increase>). Howard went on to describe stories he heard students share during past competitions, "it's great to hear the students excited to be out there with their field assistants."



**Eren Abus (Miami University, Ohio)** explains her map on the Vlorë-Elbasan Transfer Zone in Albania. Image Credit USGS

"Strong field skills remain an absolutely critical thing that employers look for," AGI Director of Communications & Technology, and past map judge, Christopher Keane said. "The geologic map is an important tool because a strong map will be the synthesis of many aspects in geology."

The last two competitions have taken place in the evening session at the poster hall at GSA meetings, and the numbers of students participating are gradually increasing. This year, about 40 of the students who had registered were able to present their map. About 15 judges from the participating organizations—all with significant mapping expertise—went around interviewing the different students and evaluating their work.

The completion is colloquial yet fierce. Howard explained that he hopes students participating recognize that they are in good company with their fellow contestants, and that they take as much guidance from their peers, as they do the judges. There are also prizes that will help any budding mapping geologist out in their career. The first place student receives a Brunton Compass contributed by the AASG and their map will also receive a limited run in the Journal of Maps. The sec



**Ryan Deasy (Indiana University, Indiana)** explains details on his map titled, "EDMAP Bedrock Geologic Map of the Paleozoic Rocks of Western New Haven Quadrangle, Connecticut"





**University of Nevada Reno swept the 2014 Competition. 1st Place was Chad Carlson for “Geologic Mapping at the Northern Terminus of the Central Walker Lane, Western Nevada: Kinematics and Strain Transfer Mechanism in an Evolving Transform Plate Boundary.” 2nd Place Russell Di Fiori for “Structural Analysis of Gold Mineralization in the Southern Eureka Mining District, Nevada: A Predictive Structural Setting for Carlin-Type Gold Deposits.” 3rd Place Joel Edwards for Structural Controls and Preliminary Geologic Map of the Neal Hot Springs Geothermal Area, Malheur County, Oregon.”**  
Image Credit: USGS.

second place student also receives a rock-hammer or hand lens contributed by the AIPG. The third place student will receive a GSA publication (book, fieldtrip guide, or memoir) contributed by the GSA Foundation. The top three winners are all recognized with certificates signed by the partner organizations, and will have their names installed on a plaque located in the USGS Headquarters in Reston, VA.

One of the common challenges for students is that lack of detail can result in a lower rating by the judges. Keane noted, “There will be a great map that focuses on the tectonics, but they’ll forget to map the fluvial plains, which I know exist because I’ve mapped there.”

Howard implores students to read the rules thoroughly and, “include all the map components: contour lines, north arrows, scale bars, latitude and longitude.” Many times maps were rated lower because of major missing components for a geologic map. In addition, he said, “these maps must have a significant field component, and may not just be a fault distribution map, isopach, map compilation, or data collected by remote sensing. The students that do well are the students that are detail-oriented, and are good about interpreting and transferring field data to their map.”

Keane echoed, “A geologic map is ultimately an interpretation, and we’re looking for data: strikes and dips, foliation, that gives us [judges] some idea of where the interpretation is coming from. A strong geologic map show data in a way, through measurements and cross-section interpretations that it tells its own story.”

To help ensure that students can create the highest quality map, the rules are being released early, first in GeoSpectrum, and to the departments. Howard also works closely with the GSA to make entering the contest as easy as clicking a button when submitting their abstract. Any students interested in this competition should not hesitate to contact Mike Marketti at the USGS, the best student geologic map competition coordinator at [mmarketti@usgs.gov](mailto:mmarketti@usgs.gov).

“We hope this competition will really invigorate geologic mapping,” Howard said, “Participants and judges are able to see how other universities are doing it, not just in the U.S. but around the globe. And it may expose students, who may not have had the opportunity to incorporate field work yet, to try getting out there and creating a geologic map.”

## 2015 Best Student Map Competition

The US Geological Survey (USGS) National Cooperative Geologic Mapping Program (NCGMP) in partnership with The Geological Society of America (GSA), GSA Foundation, Association of American State Geologists (AASG), American Geosciences Institute (AGI), American Institute of Professional Geologists (AIPG), and the Journal of Maps invites students to participate in the Best Student Geologic Map Competition.

This year marks the third annual Best Student Geologic Map Competition at the GSA Annual Meeting in Baltimore, Maryland. The competition will highlight student research from around the world that utilizes field mapping and the creation of geologic maps as a major component.

The top three student geologic maps will be selected for recognition and awards at a special judging session at the GSA Annual Meeting. Students will post their maps (Session Posters) on Tuesday, 3 November by 5:00 PM until 6:30 PM in the Poster Session area of the Exhibit Hall for review and evaluation by the judges. Maps may be placed in this area as early as 9 AM Tuesday, 3 November, but must be removed at 6:30 PM following the session. At the end of the session the top three maps will be selected and awarded.

### Awards

The First place student will receive the honor of constructing the Best Student Geologic Map for this year, a Certificate of Recognition signed by the sponsoring representatives, and a Brunton Compass sponsored by the AASG. The student's name will also be added to a Best Student Geologic Map plaque that is posted at USGS Headquarters in Reston, Virginia. The first place map will also receive a limited run in the Journal of Maps.

The Second place student will receive the honor and a Certificate of Recognition signed by the sponsoring representatives along with a rock-hammer and hand lens sponsored by the AIPG.

The Third place student will receive the honor and a Certificate of Recognition signed by the sponsoring representatives along with a GSA publication (book, fieldtrip guide, or memoir) sponsored by the GSA Foundation.

In addition, all winners will receive an offer to publish their map in the Student Edition of the Journal of Maps and the opportunity to be published in the full journal. The top three student maps will also be recognized and announced on the GSA Website, GSA Today and GSA Connection, AGI Spectrum, and the USGS Website.

### Eligibility

The competition is open to all students at any level of their academic career (B.S., M.S., or Ph.D.) who has created a geologic map through their recent and substantial field work. Students must also submit their map as a significant component of their research as the principal author to any poster or oral presentation session at the GSA Annual Meeting. Students who have recently graduated within the past year are also eligible. An eligible geologic map should include all the required components as described in the Judging Criteria below.

### Submitting a Geologic Map to the Competition

Students must submit their abstract by 11 August 2015 to any GSA Session and select the appropriate box on the form to be considered for the geologic map competition. Your abstract must be accepted to be eligible for the completion. **ONLY CHECK THIS BOX IF YOU ARE A STUDENT AND HAVE A GEOLOGIC MAP TO BE CONSIDERED IN THE COMPETITION!**

### Judging Criteria

A geologic map is defined as a map that depicts the geographic distribution at the earth's surface of bedrock and/or surficial geologic materials and structures, on a published base-map showing topography, hydrography, culture, cadastral, and other base information. Geologic units are identified by color and correlated to the description of map units (DMU). Geologic structures are shown with symbols that allow the user to visualize the features in three-dimensional orientations.

A geologic map should include the applicable components that sufficiently illustrate the geology of the area mapped, including:

- A clear and legible base (include base map credit and map projection)
- Scale and contour interval
- North arrow and magnetic declination
- Title, authorship, publisher (if published), and date. The student(s) must be the principal author(s).
- Location index map
- Field data or field data stations (strike and dip, coring stations, GPS control stations, etc.)
- Description of map units (DMU)
- Correlation of map units (CMU)
- Explanation of map symbols
- Map unit symbols on map
- A geologic map may also include stratigraphic columns, cross sections, and text.

Submitted geologic maps should be at a scale of 1:24,000 or larger. However, 1:25,000 to 1:62,500 scales are acceptable. Reconnaissance geologic maps are not acceptable.

Examples of maps that are not considered appropriate substitutes for geologic maps include: structure contour maps, isopach maps, stratigraphic and/or facies diagrams, aquifer maps, gravity or magnetic anomaly maps, and element-distribution geochemical maps. These maps are not eligible and will not be judged if submitted. Additionally, submissions of geologic maps that are digital map compilations or digitization maps are not acceptable and will not be judged.

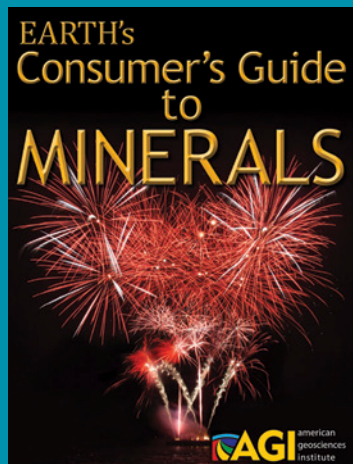
For your information: A useful website for digital Geologic mapping standards and mapping symbolization can be found at the USGS ([http://ngmdb.usgs.gov/fgdc\\_gds/](http://ngmdb.usgs.gov/fgdc_gds/)).

### Selection Process

Submitted geologic maps will be evaluated by a panel of at least 4 judges based on the criteria outlined above. Each map should stand on its own without explanation by the student author. Students must post their maps in the designated area on Tuesday, 3 November no later than 5:00 PM in the Poster Session area of the Exhibit Hall for judging although judges will also be evaluating student maps during poster sessions. Maps may be posted as early as 9:00 AM on Tuesday, 3 November in the designated area, but must be removed at 6:30 PM following the session. We encourage student participants to be present at this session to network and share information about their maps when judges are evaluating and selecting the top three maps. The award ceremony will take place at the end of this session.

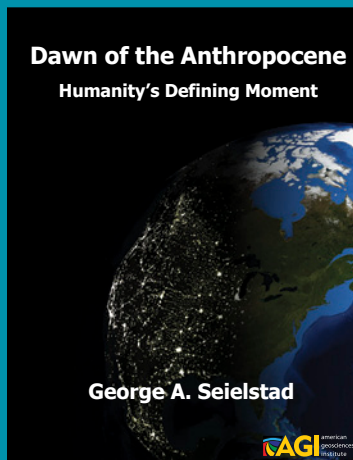


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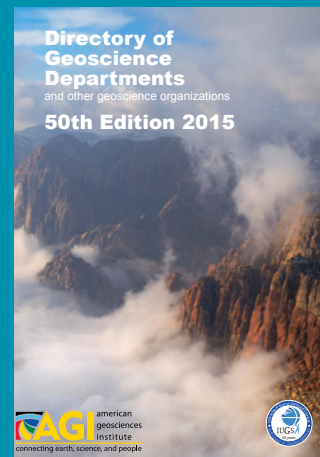
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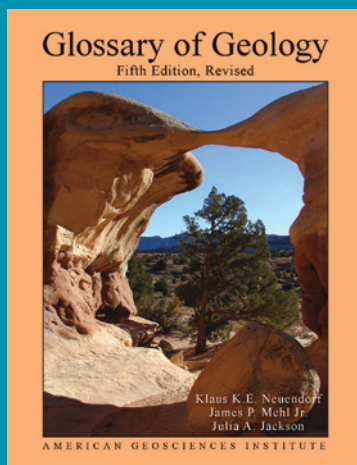
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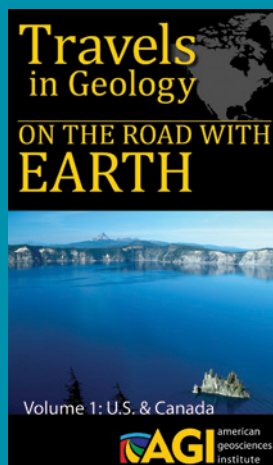
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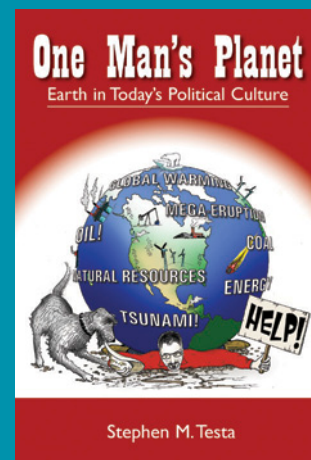
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## Obstacles and Opportunity Abound in Mexico

By Heather Saucier

American Association of Petroleum Geologists

Typically when runners are on their marks, they know the course ahead of them.

However, as industry players anxiously wait for Mexico to open its hydrocarbon-rich fields to foreign investors, the shortest course to the pay zone is not so clear.

Petróleos Mexicanos (Pemex), which has served as Mexico's national oil company for the past 76 years, has focused on production, rather than exploration, in order to generate roughly 30 percent of the country's revenue.

After watching the country's production rate steadily decline over the last decade, Mexican President Enrique Peña Nieto amended the country's constitution last August to allow third party operators to help achieve Mexico's short-term goal of raising production by 20 percent – to three million barrels a day – by 2018.

Up for grabs in the imminent Round One of bidding are 169 blocks for exploration and exploitation. They include mature oil and gas fields, the deep waters of the western Gulf of Mexico, heavy oil and the country's untapped shale formations.

Energy companies just north of the border are eager to dive into the exploration and production of Mexico's estimated 159 billion barrels of oil equivalent – but where will they go first?

When weighing the options, concerns about security, corruption and lack of infrastructure inevitably crop up.

Factor in the tricky economics caused by the falling price of oil and gas, and the course for the players in this historical new play is anyone's guess.

### The Playing Field

Mexico's most prolific oil field, the offshore Cantarell, once produced 66 percent of the nation's oil. It peaked in 2004 at 2.2 million barrels a day before dwindling down to today's 350,000 barrels.

Supplementing Cantarell is the offshore Ku-Maloob-Zaap field with 900,000 barrels a day.

Despite the fact that only six of the country's 12 basins with petroleum systems currently produce, Mexico is one of the top 10 oil and gas producers in the world,

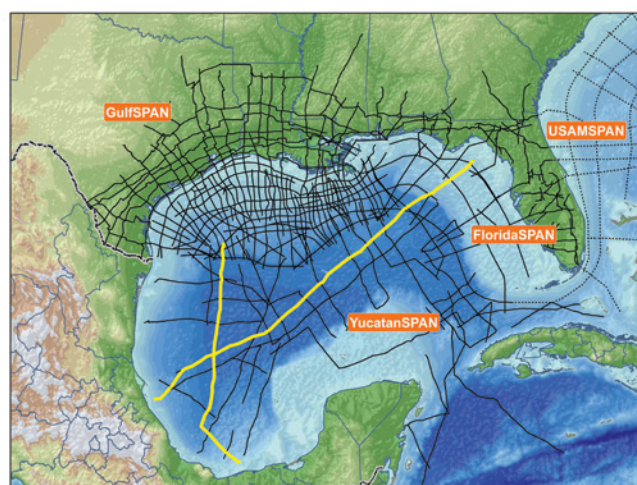


Image Credit: AAPG

said Alfredo E. Guzmán, director for exploration and new ventures for Casa Exploration, a former executive for Pemex, former president of the AAPG Latin America Region and former AAPG vice president-Regions.

In fact, of the roughly 600 oil and gas fields in onshore and offshore Mexico, just a handful produce more than 80 percent of the country's oil and gas, Guzmán said.

That leaves the stakes wide open for foreign investors who soon will have access to 109 blocks of prospective resources for exploration and 60 fields with 2P reserves for exploitation.

The blocks fall into five categories:

- Deepwater Perdido area.
- Deepwater south.
- Chicontepec Basin (conventional and unconventional plays).
- Onshore, shallow waters and extra-heavy oils.
- Sabinas Basin (unconventional plays).

Mexico has discovered in its subsurface 263 billion barrels of oil and 279 trillion cubic feet of gas, Guzmán said. Those numbers do not include the "yet-to-be-found" conventional and unconventional resources.

If Pemex's estimate of 435 billion barrels of oil equivalent for the country's total endowment is correct, there



are at least 159 billion barrels of oil equivalent to be produced, Guzmán said.

## Low-Hanging Fruit

Guzmán predicts that operators will find it most worthwhile to explore and exploit Mexico's deep waters in the Gulf of Mexico and its shale, as both remain untouched and ripe for production.

Twenty-five exploratory wells have been drilled by Pemex with economic successes in the Mexican Perdido Fold Belt and the Catemaco Fold Belt provinces, he said.

"It has been confirmed that the Perdido Fold Belt enters Mexico with better conditions than across the border," Guzmán said.

Four discoveries in the Perdido Fold Belt have been made in the Supremus, Trion, Maximo and Vespa fields, with Trion being the best with 3P reserves estimated at 480 million barrels of oil equivalent – some of the largest in the Gulf.

"To develop and produce these fields, it will no doubt require the major players – the ones with the deepwater experience," Guzmán said. "It is extremely low-hanging fruit."

In terms of unconventional oil and gas, ideal plays lie in the Paleozoic shale in the north, the Eagle Ford shale in the northeast, and the Jurassic shale in east central

Mexico, Guzmán said. All three areas have the potential to produce liquids-rich gas, light oil and light-to-heavy oil.

To date, nine exploratory wells have been drilled in unconventional plays and 112 million barrels of oil equivalent of 3P reserves have been found. In the next four years, Pemex plans to invest \$3 billion to drill 175 wells and acquire roughly 4,000 square miles of 3-D seismic data, Guzmán said.

While many may be eying the Eagle Ford shale – its proof in the pudding already found in Texas – unconventional plays that could top it are the Upper Jurassic (Tithonian) shales just south of the Burgos field, said AAPG member J. Antonio Cuevas-Leree, president of the Mexican Petroleum Geologist Association and former exploration manager in the Northern and Southern Regions of Mexico at Pemex.

When factoring in today's economics, however, Cuevas-Leree insists the most lucrative opportunities lie in unexplored conventional plays – particularly the Austin Chalk and Edwards Limestone in northeastern Mexico, the Lower Jurassic Huayacocotla play in the Tampico Misantla Basin and the dolomitic facies of the Upper Tithonian in the southern region.

Looking from Texas across the border, others agree.

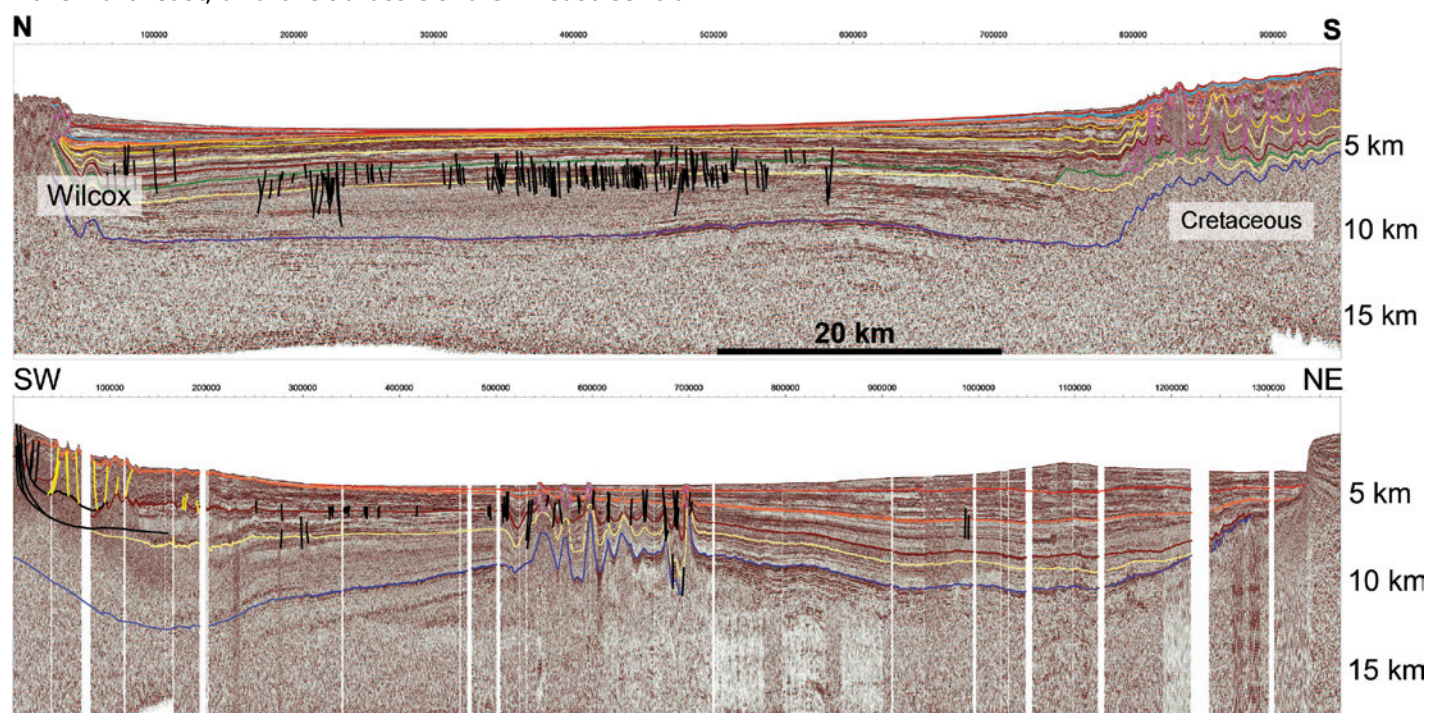


Image Credit: AAPG



"I would think some of the best opportunities might be in the development of existing fields by using the application of new reservoir technologies to improve production rates and add reserves," said AAPG member Brian Horn, chief geologist at ION Geophysical. "While the deep water is very prospective, the well cost, development cost and time to first oil will require a more long-term approach."

Most companies are looking to monetize their assets, he added. Given the recent dip in oil and gas prices, operators and service companies that bring new technology and fresh ideas – which increase production or decrease cost in Mexico's mature basins – could reap rewards the fastest, he speculated.

## Obstacle Course?

While opportunities in Mexico abound, so do obstacles. Guzmán is the first to admit that issues with security, corruption and lack of infrastructure could detract foreign investors.

He is quick to point out, however, the Mexican government already is on the case.

"The government is really working to allocate resources and create new positions in the armed forces and the police" to ensure exploration and production crews remain safe, he said.

In addition, the Mexican government is looking at ways to comply with the United States' Foreign Corrupt Practices Act, and has recently passed laws that require more oversight and regulations to prevent corruption, he added. Bids will be open, clear and transparent and available to the public via the Internet.

Furthermore, the government is implementing a large program to build and improve infrastructure – spending \$20 billion to upgrade and expand the Mexico City airport, as well as build railroads, highways and pipelines that will run through Mexico into Central America, Guzmán said.

"Mexico is one of the most open economies in the world," he said, pointing to its auto and telecommunications industries. "Mexico is a stable country. We haven't had a coup in the last 70 years."

From a geological perspective, Horn puts it best: "I think one of the best things about the opportunities in Mexico is that they are in the southern half of the most

mature oil and gas province in the world – the Gulf of Mexico," he said.

"The Gulf of Mexico is the laboratory for all new technologies in oil and gas exploration and development," he added. "Most exploration technologies have been developed in the Gulf Coast region."

"If you look at the history of our industry, you could say all roads lead to and from the Gulf of Mexico."

- Dec. 20, 2013: Mexican President Enrique Peña Nieto signs the country's proposed energy reform into law.
- Aug. 11, 2014: Mexico's constitution is amended to allow foreign investors into Mexico's prolific oil and gas fields.
- Aug. 13, 2014: Round Zero allocates 83 percent of Mexico's proven reserves and 23 percent of exploratory areas to Pemex in advance of the bidding process.
- It is estimated that Round One will occur in early 2015, allowing foreign investors to bid on 169 blocks.

## Logistics

- Pemex, once a monopoly, is now a "State Productive Enterprise" and able to operate as any international oil company.
- Mexico now can do business with foreign investors in the industry under contract models such as production sharing, profit sharing and exploration licenses.
- Mexico retains full ownership of its hydrocarbons in place and maintains exclusive control over them, yet opens itself to activities related to search and extraction.

## Assets (As per Pemex)

- Mexico has 263 BBO of oil and 279 TCF of gas in its subsurface.
- Mexico's total endowment of hydrocarbons is estimated at 435 BBOE for producing basins, including unconventional.

- An estimated 159 BBOE is waiting to be produced.
- Mexico's most prolific petroleum basins are: South-eastern, Veracruz, Tampico-Misantla, Burgos, Sabinas and the Gulf of Mexico proper.

## Round One (As per the Mexican Secretary of Energy, SENER)

- 169 blocks – 109 in new areas and 60 in areas of existing reserves – cover nearly 11 square miles.
- 2P reserves and prospective resources represent a volume of 3,782 and 14,606 MMBOE, respectively.
- Exploration and exploitation projects are expected to represent annual investments of \$8.5 billion between 2015 and 2018.

## Reauthorization of ESEA (No Child Left Behind) Heating Up

**Douglas Richardson & John Wertman**  
**Association of American Geographers**

A draft reauthorization of the Elementary and Secondary Education Act (ESEA), which is currently known as No Child Left Behind, has been released by Senator Lamar Alexander (R-TN), the new Chairman of the Senate Health, Education, Labor, and Pensions (HELP) Committee. By taking this step so early in the newly-convened 114th Congress, Alexander is signaling that he has serious interest in passing a bill in the first half of 2015. The ESEA – the nation's primary K-12 law – has not been reauthorized since early 2002.

As many AAG members are aware, the Association has been working for many years to ensure that the next enacted ESEA should include a specific funding authorization for K-12 geography education. Geography is specified as one of nine core academic subjects in the existing law but is the only one that does not have a dedicated funding stream.

In 2010, we began circulating the AAG Resolution Supporting K-12 Geography Education, which calls for funding of K-12 geography in the ESEA and urges the Obama

Administration to include geography and geospatial education in its STEM (Science, Technology, Engineering, and Mathematics) proposals. The Resolution has been endorsed by four former U.S. Secretaries of State; 20 incumbent state Governors; 25 Fortune 500 companies; and many other prominent individuals and organizations (see: [www.aag.org/AAGEducationResolution](http://www.aag.org/AAGEducationResolution)).

This large coalition of supporters of geography education that we have assembled has helped us make a forceful case to federal policy makers. As an example, please see the letter we have just sent to Senator Alexander on the [reauthorization:www.aag.org/esea\\_alexander](http://reauthorization:www.aag.org/esea_alexander).

The Senate HELP Committee has held two hearings so far in 2015 related to the ESEA: one on "Testing and Accountability" and the other on "Supporting Teachers and School Leaders."

Alexander's draft bill – which has yet to be formally introduced – does not include a listing of core academic subjects and does not specifically mention geography at all. The Chairman has indicated that he would like to pass a reauthorization bill through his panel by the end of February, but if he does so without bipartisan support, he may find it difficult to win needed Democratic votes (to avoid a filibuster) when the bill reaches the Senate floor.

We will keep you apprised of developments on this important legislation.

## Importance of Earth Science Recognized in President's Budget Proposal

### Cuts to Planetary Research Remain a Concern says American Geophysical Union

The following statement is attributable to American Geophysical Union (AGU) executive director/CEO Christine McEntee:

"AGU is very pleased to see the President's budget proposal recognize the transformative power of science to drive American prosperity and to protect our communities. After years of underfunding for non-defense discretionary science and the destructive impacts of sequestration, the President's proposed budget would repair the damage done to our capacity for innovation.

Among other initiatives, the proposal outlines a new effort to 'Invest in American Innovation' that will increase critical investments in basic research – which serve as the foundation for many of the technological and other types of advancements we rely on today. This includes increased funding for the National Science Foundation, the funding source for nearly a quarter of all federally supported basic research by America's colleges and universities, by more than five percent.

The President's proposal also demonstrates a continued recognition of the challenges we face because of climate change, as well as the critical obligation we have to take action. This funding includes efforts such as a \$7.4 billion initiative to support clean energy technology programs, \$400 million for improved flood risk maps, and programs to help communities and businesses better understand how they can protect themselves against drought, wildfires and coastal storms. It also includes \$50 million each for both NOAA and DOI to create offices dedicated to coastal resilience. The NOAA program will provide grants to states, localities, tribes and NGOs to assess vulnerabilities and develop and implement adaptation strategies, and the DOI program will support ecosystem health that protects communities through flood and storm risk reduction.

The proposal also includes a welcome increase for USGS, including for the agency's efforts to help communities and businesses be prepared for natural hazards such as earthquakes, landslides and volcanoes. In addition, the robust proposed funding for NASA's Earth Science Division will allow the agency to fulfill its crucial earth monitoring capabilities. However, we are very disappointed to see the cuts to NASA's Planetary Science programs, which could undermine future missions to explore Jupiter's moon Europa, and to the Heliophysics division, which could set back research such as how to avoid the impacts of solar storms.

We are excited about the proposal's \$3 billion investment in STEM education. This undertaking clearly demonstrates the President's commitment to ensuring that the next generation of scientists will be prepared to address the myriad challenges we face, from resources scarcity to the impacts of natural hazards and climate change. This is particularly heartening given that the focus is not solely on K-12 education, but instead also

includes funding for programs targeted at the retention of undergraduate students, helping graduate students move into careers in science, and even pushing forward groundbreaking new research on STEM education practices.

We strongly encourage Congress not to lose sight of science's game changing legacy of driving our economy and improving our quality of life. Investing in science today is an investment in our collective future. American families and businesses deserve nothing less."

AGU Contact: Joan Buhrman: 202-777-7509, 571-213-3812 (c), [jbuhrman@agu.org](mailto:jbuhrman@agu.org)

## Obama Administration Boosts Funding for Unconventional Oil and Gas Research in FY 2016 Budget

**Colleen Newman**

**American Association of Petroleum Geologists**

In 2011, President Obama released his Blueprint for a Secure Energy Future, which called for an all of the above energy strategy, including the expansion of safe and responsible oil and gas development. As a follow up to his energy blueprint, the President issued an Executive Order which established an interagency working group to meet these goals. He called on this group to: coordinate agency policy activities; coordinate the sharing of scientific, environmental and other technical information; engage in long term planning in the areas of research, natural resource assessment, and the development of infrastructure; and promote interagency communication with stakeholders.

The interagency group, which includes the U.S. Departments of Energy (DOE) and Interior (DOI) and the Environmental Protection Agency (EPA) developed a multi-agency program whose goals were to address the highest priority challenges with safely developing unconventional shale gas and tight oil resources. Specifically, the program looked to focus on timely, policy relevant science directed to research topics where collaboration among DOE, DOI and EPA can be done to provide results and technologies that support sound policy decisions.



The multi-year research plan was released in July, 2014 and identified several research areas to pursue. These included: understanding the scale and nature of U.S. oil and gas resources; water quality and availability; air quality and greenhouse gas emissions; impacts on human health; ecological impacts; and induced seismicity. The research plan also presented six cross cutting projects. These include:

- understanding resource volumes, potential scale of future drilling activity, and water consumption in representative unconventional oil and gas (UOG) plays;
- study of the potential impacts of hydraulic fracturing for oil and gas on drinking water resources;
- understanding and managing risks from unconventional oil and gas development of water resources;
- application of source and remote emission measurement methods to quantification of air from UOG operations;
- water and UOG development: ecological effects of wastewater and water withdrawal.
- induced seismicity, implications of UOG activities.

The President's fiscal year (FY) 2016 budget request reflects many of these priorities. The U.S. Geological Survey (USGS) is requesting \$14.5 million for activities related to national oil and gas resources. This is approximately \$2 million over FY 2015 enacted levels and will include funding to carry out some of the research called for in the interagency plan. Specific projects that USGS references include:

- the development of assessments of both domestic (including resources on federal lands) and global oil and gas resources including tight gas, tight oil, shale gas, and coalbed gas;
- a continuation of ongoing assessments of the Barnett Shale, the Monterey Formation, the Mancos Shale, and the Cline Shale;

- a comparison of the characteristics and impacts of unconventional gas development in Pennsylvania and New York; it would also include an investigation of baseline water quality and produced water disposal in both states as a life cycle analysis;
- research on reserve growth in existing oil and gas fields;
- in-depth studies of the geology and oil and gas resources on Alaska's North Slope, including the potential for gas hydrates;
- information sharing with the Bureau of Ocean Energy Management for outer continental shelf assessments;
- support for studies that apply cutting edge research to critical issues impacting UOG resources.

In DOE's budget request, the agency notes that it will focus on developing technologies that reduce the surface and subsurface footprint, emissions, and water use to ensure the safe development of unconventional domestic natural gas resources. A top priority will be to develop new technologies to detect and mitigate methane emissions from natural gas transmission, distribution and storage facilities as well as to communicate results to stakeholders. The DOE FY 2016 budget proposes an increase of \$18.9 million for these activities, although it cuts funding for the unconventional fossil technologies from petroleum – oil technologies program. Methane hydrate research is also zeroed out.

EPA also mentions the interagency research plan in its FY 2016 budget request as part of its research for its goal of addressing climate change and improving air quality, but does not elaborate on specific projects.

- See more at: <http://www.aapg.org/publications/blogs/energy-policy/article/articleid/16255/obama-administration-boosts-funding-for-unconventional-oil-and-gas-research-in-fy-2016-budget#sthash.4hJGssyH.dpuf>

## Dr. Kwame Awuah-Offei Named SEC Academic Fellow

**SME member to assist agency in review of mining company disclosure requirements**

**John Hayden**

**Society for Mining & Metallurgy Exploration, Inc.**

The Society for Mining, Metallurgy & Exploration Inc. (SME) is pleased to announce the U.S. Securities and Exchange Commission (SEC) has selected Dr. Kwame Awuah-Offei for the position of SEC academic fellow. He will assist the agency staff in its review of mining company disclosure requirements.

In 2012, SME filed a petition for rulemaking with the SEC to amend and update the disclosure requirements of Industry Guide 7 but was told that the SEC lacked the manpower to begin work on the rulemaking. The SEC turned to SME to help locate an academic fellow to take a one year sabbatical to work on this issue in the SEC's office in Washington, D.C.

On February 13, 2015, the SEC announced the appointment of Dr. Awuah-Offei. Dr. Awuah-Offei will work in the SEC's Division of Corporation Finance, which is reviewing whether the agency should update and modernize mining company disclosure requirements in Regulation S-K and requirements contained in Industry Guide 7.

He is associate professor of mining engineering at Missouri University of Science & Technology in Rolla, MO, where he teaches graduate and undergraduate mining engineering courses including geostatistics, surface mine design, environmental aspects of mining, simulation of mining systems and optimization applications in mining. He is also a registered professional engineer and a long-time member of SME, serving on several committees.

Dr. Awuah-Offei earned his Ph.D. in mining engineering from the University of Missouri-Rolla and his BS in mining engineering from Kwame Nkrumah University of Science & Technology, Kumasi, Ghana. He has received many awards and commendations for outstanding teaching over several years. His research, which primarily focuses on applications of numerical techniques in mining including geostatistics, has been presented in multiple publications. He has successfully mentored graduate students and new faculty in performing substantial

research that has been presented in more than 45 publications. In addition to his academic qualifications, Awuah-Offei has significant mining industry experience working as a mine engineer and consultant.

For more information, contact the SEC public affairs office at [news@sec.gov](mailto:news@sec.gov).

## What Regulatory Activities are Expected this Year for the Oil and Gas Industry?

**Colleen Newman**

**American Association of Petroleum Geologists**

As 2015 begins, the oil and gas industry is preparing itself for a plethora of regulatory activities. The following are highlights of some of the anticipated regulatory activities.

### Hydraulic Fracturing

The U.S. Department of Interior's (DOI), Bureau of Land Management (BLM) is expected to finalize its rulemaking that would impact fracking on federal lands. The rule is expected to focus on the disclosure of chemicals used for fracking, wellbore integrity, and water use and disposal for flowback water. The final rule is expected to be released any day now.

The U.S. Environmental Protection Agency (EPA) is expected to release a draft assessment report for its ongoing study of hydraulic fracturing impacts on drinking water. The final report is expected in 2016.

EPA is expected to publish a final report outlining the best practices for addressing seismic events associated with oil and gas development and wastewater activities. The report is a product of the findings of the Underground Injection Control workgroup, which convened in 2012. The report is expected to be issued in mid, 2015.

### Methane

On January 14, as part of its climate strategy, the Obama administration announced its intent to regulate methane emissions for new and modified sources in the oil and gas sector. The goal of this initiative would be a reduction of 40-45 percent of 2012 levels by 2025. This would include sources in the production, processing, transmission segments and cover completions,

pneumatic pumps, leaks at well sites, gathering and boosting stations, and compressor stations. A proposed rule is expected in the middle of 2015 with a final rule sometime in 2016. Although existing sources would not be included at this point, the Administration is looking to EPA, Department of Energy (DOE), and the Department of Transportation's Pipeline and Hazardous Materials Safety Administration (PHMSA) to work with industry on voluntary programs to address existing sources in the oil and gas sector.

As part of this initiative, BLM is charged with developing a rulemaking limiting the amount of methane that can be vented and flared on federal lands.

Other measures that are called for include: volatile organic compounds control technology guidelines to achieve methane reduction co-benefits (expected to be proposed by EPA in the middle of 2015), increased detection and reporting under EPA's greenhouse gas reporting program, and revised natural gas pipeline standards. In addition the President's methane strategy calls for measures to encourage more energy efficient equipment, research and development for better detection of leaks, and general modernization of natural gas infrastructure.

## Ozone

EPA recently released a proposed rule calling for more stringent standards (most likely down to the .65 - .70 parts per billion (ppb) range) for ozone which are expected to impact the oil and gas industry. The current standard is .75 ppb. A final rule is expected by the end of 2015.

Stricter ozone standards may put areas with oil and gas development into non-attainment. As part of a state implementation program oil and gas operations are likely to be targeted because they are large source of ozone.

## Waters of the U.S.

EPA is expected to finalize a ruling that would broaden the scope of the "waters of the U.S." under the Clean Water Act. This regulation is of concern to the oil and gas industry because it would give EPA expanded authority over land and water use, which could create for more federal permitting, which would likely slow oil and gas

operations and create new costs. A final rulemaking could come as early as spring 2015.

## Other Rulemakings to Watch

DOI's Bureau of Safety and Environmental Enforcement (BSEE) is expected to issue a proposed rule to make blowout preventers more reliable. It may also address factors such as well design, well control, safe drilling margins, casing and cementing, and subsea containment.

BSEE and the Bureau of Ocean Management are expected to propose rules addressing Arctic drilling in early 2015. The proposed rules are expected to require companies to develop plans to address well blowouts. It is also likely to address health, safety, and environmental concerns. While announcing BOEM's plans for the next outercontinental shelf five year plan this week, Secretary Jewell said that the Arctic rules should be forthcoming.

DOI is expected to make a determination on whether the greater sage grouse will be listed as an endangered species by September, 2015.

PHMSA is expected to issue a final rule on addressing the safety of transport of oil on railroad cars. The rule could come out at any time.

- See more at: <http://www.aapg.org/publications/blogs/energy-policy/article/articleid/15720/what-regulatory-activities-are-expected-this-year-for-the-oil-and-gas-industry#sthash.OwpQDKH6.dpuf>

## Field Experiments for Methane Production from Hydrates

**Developing and testing technologies for production from marine and arctic methane hydrates, a potential clean energy resource**

**Edith Allison**

**American Association of Petroleum Geologists**

The U.S. Department of Energy (DOE) methane-hydrate program is making a giant leap forward in 2015 with a new field test. Field tests are critical to understanding the characteristics of in-situ hydrates and their potential to produce methane. However, field experiments are expensive and complicated, requiring a drillship and the participation of many scientists and engineers from multiple organizations. One does not



need a calculator to tally the number of offshore and arctic production experiments.

One question might be why we should care about methane hydrates. There are three major reasons why we should. First, the world will continue to depend on fossil fuels well past 2040—as far ahead as most reliable projections—and natural gas is the cleanest option. Second, some countries that do not have sufficient indigenous energy have potentially large methane hydrate resources—Japan, Korea and India for example. Finally, methane hydrates occur in low concentrations over vast areas of the seafloor and shallow subsea sediments around the world, including the Arctic. If these areas get warmer, the hydrates may dissociate releasing methane.

We may not need the natural gas today, but remember that in the early 1990s research into shale gas was considered a waste of time and money. It was this research that helped industry develop the technology that has made the U.S. a global energy power.

In the past 15 years global methane-hydrate research has moved from predicting general locations where deposits might occur to using sophisticated geophysical techniques to pinpoint potentially commercial subsurface deposits.

The small numbers of field tests are the product of dozens of laboratory and geophysical studies and field measurements by scientists in many countries. These studies clarified the geologic conditions necessary for highly concentrated hydrate deposits and developed the remote sensing technologies needed to locate concentrated deposits. In addition, scientists have clarified the role of methane hydrates in the global carbon cycle.

The next U.S. field test is planned by the University of Texas at Austin, in partnership with The Ohio State University, Columbia University-Lamont-Doherty Earth Observatory, the Consortium for Ocean Leadership and the U.S. Geological Survey. Their four-year effort plans to characterize prospective drilling locations in the Gulf of Mexico, then collect pressure cores and well logs and conduct short-duration pressure drawdown tests in 2018.

The last Gulf of Mexico coring and pressure drawdown testing expeditions were in 2005 and 2009.

Japan, India and South Korea are also characterizing offshore hydrate deposits in anticipation of future production testing.

- The Japanese government completed a successful flow test, producing methane from marine hydrates in the Pacific Ocean offshore southeastern Japan in 2012-13. This followed a 2004 coring and well logging expedition. In addition, in 2014 Japan measured and sampled methane hydrates in the Sea of Japan.
- In 2006 a multi-national team led by the Indian Directorate General of Hydrocarbons collected cores and well logs at 21 sites offshore India.
- South Korea conducted offshore expeditions in 2007 and 2010 to characterize and quantify their resource, and plans to conduct a production test in 2015.

The production potential of methane hydrates has also been tested in the Arctic.

- In 2007-08 a multi-national team led by Canada and Japan completed experiments on the thermal and depressurization production of methane from hydrates at a location in the Mackenzie delta, Northwest Territories, Canada. These experiments were preceded by a 1998 stratigraphic test well and a 2002 thermal heating experiment.
- In 2007 a DOE-BP project successfully drilled, cored and tested a well in the Prudhoe Bay field to help define how hydrate deposits respond to depressurization
- In 2011-12 the DOE partnered with ConocoPhillips and the Japan Oil, Gas and Metals National Corporation to inject carbon dioxide (CO<sub>2</sub>) into a Prudhoe Bay well to determine the efficiency of simultaneous methane production and CO<sub>2</sub> storage in the hydrate reservoir.

## Lura Joseph Honored for Distinguished Service in Geoscience Information



**Lura E. Joseph - 2014 Mary B. Ansari Distinguished Service Award Winner for GSIS. Image Credit GSIS**

**Shaun Hardy  
Geoscience Information Society**

Lura E. Joseph, Content Access and Research Services Librarian at the University of Illinois at Urbana-Champaign (UIUC), was honored recently by the Geoscience Information Society (GSIS) with the 2014 Mary B. Ansari Distinguished Service Award. The award was presented in October at the society's annual meeting in Vancouver, British Columbia and recognizes significant contributions to the field of geoscience information.

Joseph's distinguished record of professional activity and research was key to her selection, in particular her work documenting geological field trip guidebooks. "Lura is recognized as a vocal advocate for the recognition of the value of guidebooks to the geoscience literature," commented Jody Foote (University of Oklahoma) on behalf of the selection committee.

Joseph chaired the GSIS Guidebooks Committee for many years and is a principal contributor to the American Geosciences Institute's Geologic Guidebooks of North America Database. She is the author of nine peer-reviewed journal articles as well as numerous book chapters, reviews, and conference and workshop presentations. Her research on image and figure quality in digitized journal backfile packages garnered the GSIS Best Paper Award in 2007.

From 2001 to 2012 Joseph served as Geology and Digital Projects Librarian at UIUC. She is a past president of the Geoscience Information Society and edited the 2004 GSIS Proceedings. For several years she was an instructor in the "Geoscience Librarianship 101" short course offered to new professionals in the field.

The Ansari Distinguished Service Award was established in 2005 through the generous support of Mary B. Ansari, Director Emerita for Branch Libraries and



**Lura Joseph (center) accepts the Mary B. Ansari Distinguished Service Award from Amanda Bielskas (Columbia University) and Jody Foote (University of Oklahoma) at the October 2014 Meeting of the Geoscience Information Society in Vancouver, Canada. Image Credit: GSIS.**

Administrative Services, University of Nevada-Reno and past president of the Geoscience Information Society.

The Geoscience Information Society is an international professional organization devoted to improving the exchange of information in the earth sciences. The membership consists of librarians, editors, cartographers, educators, and information professionals. Information about the Society may be found at its website [www.geoinfo.org](http://www.geoinfo.org).

## 2014 Winners of AESE Outstanding Publication Award

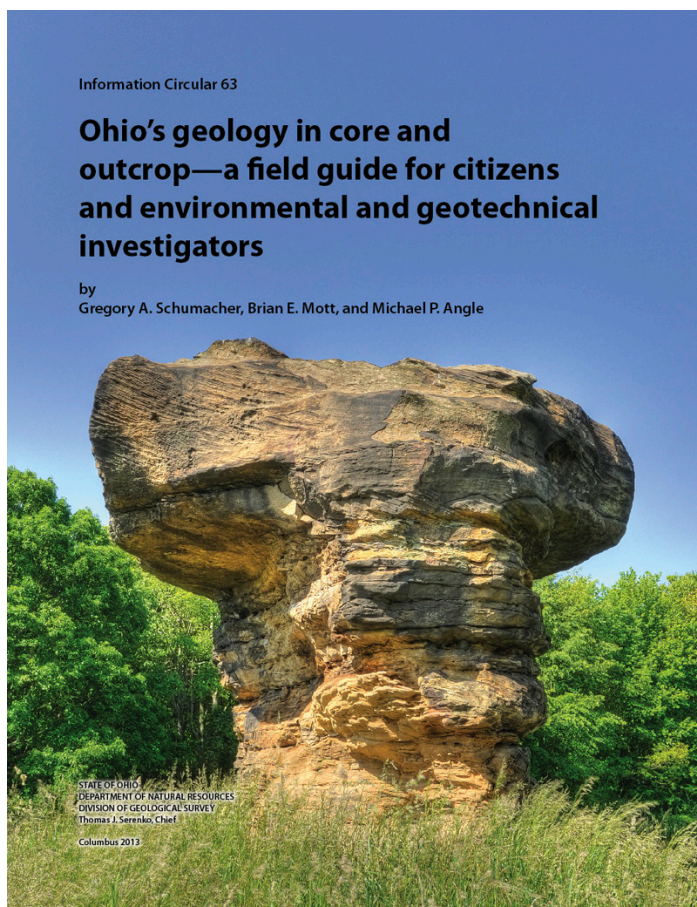
**Association of Earth Science Editors**

The winner...or rather, the winners—there was a tie!—of the AESE Outstanding Publication Award in the Print Category were announced at the 2014 annual meeting held in Lexington, Kentucky, October 7–10. Both are fabulous publications.

### **Congratulations go to the State of Ohio Division of Geological Survey**

This spiral-bound publication is printed on waterproof paper and is designed for use both indoors and in the field. The field guide provides a succinct summary of the state's geology through an introductory section and 65



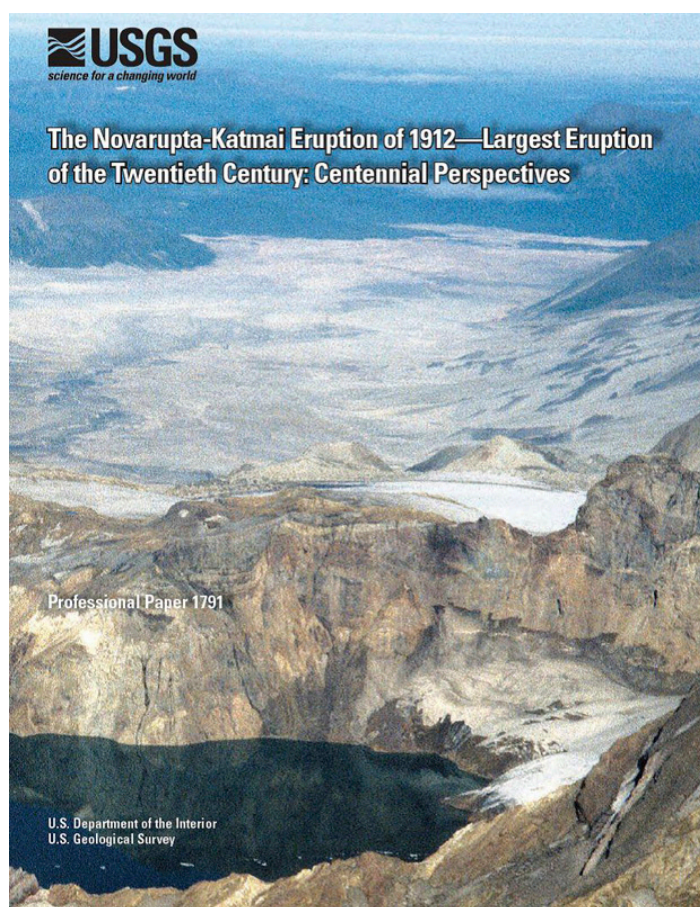


*Ohio's Geology in Core and Outcrop: A Field Guide for Citizens and Environmental and Geotechnical Investigators*

fact sheets describing more than 100 surficial and bed-rock units found across the Ohio landscape. The result is a detailed, comprehensive view of the diagnostic features of Ohio's near-surface geologic units in both natural and man-made exposures, as well as in core drilled through these geologic units. More information about this publication can be found at <http://www2.ohiodnr.com/geosurvey/extra-news-archives/2013-articles/ic-63-core-outcrop-field-guide>.

## Congratulations also go to the U.S. Geological Survey

This book is both a technical work and one aimed at a broad audience. As a technical work it summarizes many decades of scientific research into the great 1912 Novarupta-Katmai eruption in Alaska and reviews the significant contributions of that research to the science of volcanology. As a work for a broader audience it places the eruption, in the year of its 100th anniversary, into the context and perspective of history—the evolution



*The Novarupta-Katmai Eruption of 1912 — Largest Eruption of the Twentieth Century: Centennial Perspectives* by Wes Hildreth and Judy Fierstein. USGS Professional Paper 1791 Published 2012

of both science and society in the 20th century—and it recounts the fascinating story of the successive expeditions that explored and studied the site of the eruption and its products in a wild and remote part of the American Arctic. More information and free download available at <http://pubs.usgs.gov/pp/1791/>.

## David Worthington Wins AAPG Foundation's Highest Honor

Vern Stefanic

**American Association of Petroleum Geologists**

David Worthington, a significant contributor to the AAPG Foundation and an officer and leader of both the Foundation and the Trustee Associates, has been named the recipient of this year's L. Austin Weeks Memorial Medal.



The award, given in recognition of extraordinary philanthropy and service in advancing the mission of the AAPG Foundation, is the Foundation's highest honor.

Worthington will receive the award during the opening session of the AAPG Annual Convention and Exhibition, which will be held May 31-June 3 in Denver.

Worthington, the former CEO of TGS-Calibre and chairman of TGS-NOPEC, and his wife, Beverly, now reside in Naples, Fla.

A Foundation Trustee Associate since 2001, Worthington has been both vice chairman and secretary-treasurer for the group, as well as chair of the 2014 Trustee Associates Site Selection Committee.

He has served as a member of the AAPG Foundation's Member of the Corporation since 2013.

He and his wife, Beverly, also have established two named grants with the Foundation's Grants-in-Aid program – the David W. Worthington Named Grant and the David W. Worthington Family Named Grant, both created and awarded annually to deserving graduate students studying paleontology.

A native of Worcester, Mass., Worthington received a bachelor's degree in geology from Marietta College in Marietta, Ohio, and a master's degree in geophysics from Virginia Tech University.

He began his career with a 12-year stint at Shell Oil, eventually becoming exploration manager of Shell's Gulf of Mexico and Atlantic Division. He left Shell to form his own offshore exploration firm, which transitioned into TGS Geophysical Co.

That company later became TGS-Calibre and, through a merger, TGS-NOPEC, where Worthington served as chairman from 1999-2004, remaining on the board through June 2007.

The L. Austin Weeks Memorial Medal was established in 2008, and Worthington is the award's eighth recipient. Others have been:

- 2008 – Marta Weeks
- 2009 – T. Boone Pickens
- 2010 – Larry Funkhouser
- 2011 – Jack C. Threet
- 2012 – William J. "Bill" Barrett
- 2013 – Robert "Bob" Gunn
- 2014 – James A. Hartman

## SEPM Announces the Newly Elected Council Members - Taking office May 30, 2015

**Howard Harper**  
**The Society for Sedimentary Geology**

### **President-Elect: Vitor Abreu**

Vitor Abreu, a Senior Technical Consultant at Exxonmobil Upstream Research Company, is a longtime active member of SEPM, serving as SEPM Research Councilor (2004-2006), as well as organizing and chairing technical sessions at annual meetings and serving on the Annual Meeting Committee. More than 1000 students from around the globe have taken his SEPM short course on "Sequence Stratigraphy for Graduate Students" since 2000. This course has been taught at the US annual meeting, international meetings, at universities and geological societies around the world continuously since it was first offered. Vitor is the chief editor of SEPM's "Sequence Stratigraphy of Siliciclastic Systems – Atlas of Exercises", which has sold almost 3000 copies since publication in 2010. His Ph.D. work also had a strong impact on the SEPM Special Publication 60, where he documented glacial events in the Cenozoic and Upper Cretaceous and their correlation with sequence stratigraphic surfaces globally.

### **Paleontology Councilor: David Bottjer**

David J. Bottjer, a professor at University of Southern California, has been an active member of SEPM since 1974. He has served SEPM as Editor of *Palaaios* (1989-1996) as well as being a member of numerous SEPM committees, including present membership on the Moore and Twenhofel Medal selection committees. He has been President of the Pacific Section SEPM (2001-2002) and the Paleontological Society (2004-2006), and is Editor-in-Chief of *Palaogeography*, *Palaeoclimatology*, *Palaeoecology* (2000-). He is a Fellow of the Geological Society of America (1986), the American Association for the Advancement of Science (1999), and the Paleontological Society (2007), as well as an Honorary Member of Pacific Section SEPM (2014). In 2014 he was the recipient of the Moore Medal from SEPM.

## **Sedimentology Councilor: Michael Blum,**

Mike Blum, a professor at University of Kansas, has been an SEPM member since 1988. He has previously served as Associate Editor for the Journal of Sedimentary Research, and as President of the Gulf Coast Section SEPM. He served as convener of the 7th International Conference on Fluvial Sedimentology in Lincoln, Nebraska in 2001, has organized or co-organized numerous sessions at national and international conferences, was a member of the NSF Margins Source-to-Sink Steering Committee, has served on numerous NSF and other review panels. Mike has previously held positions at Southern Illinois, University of Nebraska, Louisiana State University, and Exxonmobil Upstream Research. He is also a member of GSA, IAS, and AGU, and is currently planning to co-organize and convene an SEPM Research Conference on Deltas.

## **Student Councilor: Hannah Hilbert-Wolf**

Hannah L. Hilbert-Wolf, a PhD candidate at James Cook University (Australia), has been a student member of SEPM since 2012. She is also a member of the GSA, SVP, AAPG, IAS, SEG, AWG, AAAS, Sigma Xi, and NSGT. Hannah received her BA degree, with distinction, in Geology from Carleton College (USA) in 2012. She is currently studying sedimentology, geochronology, and paleoseismicity under Dr. E. Roberts and Dr. P. Dirks. Her current research focuses on reconstructing the history of an important segment of the East African Rift System in Tanzania, through the development of a novel approach to basin analysis. Hannah has also worked on sedimentology research projects in Utah, Alaska, and South Africa. In addition to assisting the teaching of sedimentology classes, labs and fieldtrips, Hannah is a volunteer tutor for young aboriginal students, and has served as a Science Ambassador for the Queensland Division of the Academy of Technological Sciences and Engineering. She has recently received a grant from the AAPG to support her PhD research, and is an alumnus of the SEG/ExxonMobil Student Education Program and the International University Consortium in Earth Science Summer School.

## **PALAIOS Co-Editor: Gabriela Mángano**

Gabriela Mángano, a professor at the University of Saskatchewan, received her degree in Geology at the University of Buenos Aires (Argentina) and got her PhD at the same institution (1992). After finishing a degree in Philosophy, specializing in Philosophy of Sciences (University of Tucuman, Argentina, 1994), she went to the Kansas Geological Survey as a postdoctoral fellow (1994-1998). She returned to Argentina in 1998 to take a position as Researcher at the Argentinean Research Council until 2004 when she arrived at Saskatchewan. She has been part of the Editorial Board of PALAIOS since 2004, being also a member of the Editorial Board of other paleontological journals, such as Journal of Paleontology, Paleontologia Electronica, Ameghiniana and Revista Brasileira de Paleontologia. She has recently joined the Scientific Board of the UNESCO International Geoscience Program (IGCP). Gabriela has been involved in the organization of many scientific meetings, including the last International Palaeontological Congress that took place in Mendoza, Argentina earlier this year. She has supervised many postdoctoral PhD and MSc students. Gabriela looks forward to the opportunity of serving the paleontological community as Co-Editor of Palaios.

## **Geological Society of London Awards 2015**

### **Geological Society of London**

We are delighted to announce the winners of our 2015 awards, to be presented at President's Day on 3 June.

### **The Wollaston Medal**

The Wollaston Medal, our highest award, is this year presented to James Jackson, Professor of Active Tectonics at the University of Cambridge. Professor Jackson's insights into active tectonics cover a wide range of regions, including New Zealand, Iran, Turkey, Greece and Tibet. By observing the active processes which shape our continents he has made vital contributions to the study of the evolution and deformation of continents on all scales, from the movement of individual faults in earthquakes to the evolution of mountain belts. Through his teaching, he has inspired a generation of geologists in a wide range of fields.

The Wollaston Medal is presented to geologists whose research has had a substantial impact on pure or applied aspects of geology. It was first awarded in 1831 to William Smith, whose geological map of England, Wales and part of Scotland, now regarded as 'the map that changed the world', was the first of its kind. First published in 1815, the map is this year celebrating its bicentenary.

## Lyell Medal

The winner of this year's Lyell Medal, awarded to geologists whose research has made a significant contribution to 'soft' rock studies, is Professor Colin Ballantyne of the University of St Andrews. Through meticulous and painstaking field research in the UK, the Alps, New Zealand and North America, Professor Ballantyne has transformed our understanding of glacial and post glacial environments, and of Pleistocene ice sheet growth and decay.

The Murchison Medal, awarded to geologists who have contributed significantly to 'hard' rock studies, is awarded to Geoffrey Wadge of the University of Reading. His major contributions in the field of geology and remote sensing cover a wide range of areas, including volcanology, Caribbean tectonics and the development of novel methods of monitoring volcanoes, contributing to the study of volcanic hazards and societal risk assessment.

## William Smith Medal

The William Smith Medal, awarded for excellence in applied and economic aspects of geology, is awarded to Anthony Doré, Senior Advisor to Exploration Management at Statoil, for his tireless work in forging links between industry and academia, carrying out work of exception scientific as well as economic importance.

The awards will be presented by Geological Society President Professor David Manning at President's Day on 3 June.

## The 2015 Geological Society Awards in full:

- Wollaston Medal: Professor James Jackson, University of Cambridge
- Lyell Medal: Professor Colin Ballantyne, University of St Andrews

- Murchison Medal: Professor Geoffrey Wadge, University of Reading
- William Smith Medal: Professor Anthony Doré, Statoil
- Coke Medal: Professor Sarah Davies, University of Leicester
- Coke Medal: Professor Rory Mortimore, ChalkRock Limited
- Bigsby Medal: Professor Daniel Parsons, University of Hull
- Prestwich Medal: Professor Alastair Robertson, University of Edinburgh
- Aberconway Medal: Dr Stuart Archer, Dana Petroleum
- Sue Tyler Friedman Medal: Dr David Branagan, University of Sydney
- Distinguished Service Award: Professor John Catt
- R H Worth Prize: Mr Peter Loader, Teacher
- Wollaston Fund: Dr Stefanie Hautmann, University of Bristol
- William Smith Fund: Dr Sarah Bradley, Utrecht University
- Lyell Fund: Dr Esther Sumner, University of Southampton
- Murchison Fund: Dr Sebastian Watt, University of Birmingham



## 2015 Harriet Evelyn Wallace Scholarship Winners Announced

**Heather Houlton**  
**American Geoscience Institute**

The American Geosciences Institute would like to congratulate Emma Reed and Annette Patton, both Master's candidates, as the two latest recipients of the Harriet Evelyn Wallace Scholarship. The scholarship, which is awarded to women pursuing graduate degrees in geoscience, is a \$5,000 award for one academic year, with the opportunity to renew for an additional year of support, if qualified.



Emma Reed. Image Credit: AGI

Emma Reed is attending the University of Arizona in the Department of Geosciences. Her research uses geochemical and banding proxies from coral records to investigate climate variability. She is using coral cores from three different sites in the northern Great Barrier Reef to provide more comprehensive insight into the environmental stressors. Reed is

investigating how corals responded to changing climate patterns in the past to understand how they might react to current climate change. She will be conducting field work in Australia this summer to continue this research.



Annette Patton. Image Credit: AGI

Annette Patton is investigating the September 2013 Colorado mass movement events while pursuing her Master's at Colorado State University in the Department of Geosciences. She will be conducting fieldwork in 2015 using ground-based surveys of the 2013 deposits, analyzing geospatial data including aerial imagery,

topographic data and historic photos. Her work is particularly salient because the mass movements deposited significant sediment loads to streams, impacted building infrastructures and set the stage for investigating ongoing geologic hazards. Results from her research will facilitate increased hazard awareness and public safety.

The scholarship is in its third year supporting women during their graduate studies. The original bequest was given from Harriet Evelyn Wallace, who was one of the founding members of the Geoscience Information Society (GSIS), a national organization and AGI Member Society that facilitates the exchange of information in the geosciences. The scholarship is awarded to the top 1-2% of applicants who most exemplify strong likelihoods of successful transitions from graduate school into the geoscience workforce.

## Council on Undergraduate Research Announces Geosciences Mentor Award Winner

**Lindsay Currie**  
**Council on Undergraduate Research**

**Mary M. MacLaughlin**  
**Professor of Geological Engineering,**  
**Department of Geological Engineering,**  
**Montana Tech of the University of Montana,**

Washington, D.C.-The Geosciences division of the Council on Undergraduate Research (CUR) annually recognizes an individual with the Geosciences 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 Mary M. MacLaughlin, professor of geological engineering at Montana Tech of The University of Montana, the 2014 recipient. The award will was formally presented at the Geological Society of America Meeting in Vancouver, British Columbia in October.



Mary MacLaughlin. Image Credit Geosciences Division of CUR (GeoCUR).

Mary MacLaughlin has mentored 37 undergraduates in six different geoscience related disciplines in rock mechanics research. A successful grant-writer, she has established a \$1M laboratory. She mentors her students through complicated experiments, detailed measurements, and the presentation and publication of research outcomes. Often these collaborations are with multiple research institutions. One student explained that she saw each student 'as a capable researcher who could produce significant and impactful results.' Described as a 'fierce advocate for training women for careers in the STEM disciplines' by a nominator, half of MacLaughlin's students have been female, a remarkable accomplishment in the field of geological engineering.

MacLaughlin's impact reaches beyond the students in her own research lab. As the chair of Montana Tech's Undergraduate Research Program, she successfully shepherds the program through difficult funding circumstances while instituting new programs for freshmen and sophomore students and advanced students. Known as an 'evangelist' for undergraduate research, she also mentors faculty on developing their own successful undergraduate research programs.

## Application: Undergraduate Research Mentor Award

The Geosciences Division of the Council on Undergraduate Research has established an annual award to

highlight the importance of mentoring undergraduate research activities.

Eligibility: All Geoscience faculty involved in mentoring undergraduate research.

Prize: \$500 along with a year-long CUR membership.

Expectations of Awardee: Short presentation when prize is awarded during the NAGT luncheon at the national GSA conference each fall.

## Award Citation

The Geosciences Division of CUR annually recognizes 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.

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.

## Application Process

Nomination (including self nominations) materials: A two-page detailed narrative exploring how the candidate meets the criteria of the award, up to five-page CV that is focused on interactions with students, and two to five letters of support (at least one letter from a former student). The application remains on file for three years. Send completed nomination packet to: Laura Guertin ([guertin@psu.edu](mailto:guertin@psu.edu)) and Erin Kraal ([kraal@kutztown.edu](mailto:kraal@kutztown.edu)).

The application window opens March 1st and is open for three months. Send materials electronically to the co-chairs of the award committee working group no later than June 1st of each year.

Download a [PDF flyer](#) announcing this award.

## Undergraduate Research Mentor Award Committee:

- Laura Guertin (co-chair), Penn State Brandywine ([guertin@psu.edu](mailto:guertin@psu.edu))

- Erin Kraal (co-chair), Kutztown University ([kraal@kutztown.edu](mailto:kraal@kutztown.edu))
- Diane Smith, Trinity University
- Chris Kim, Chapman University
- Lydia Fox, University of the Pacific

## 2015 AAG Honors Announced

### Association of American Geographers

The AAG will confer AAG Honors, the Association's highest honors, to eight individuals for their outstanding contributions to the advancement or welfare of geography. Each year, the AAG invites nominations from the membership, which are then presented to the AAG Honors Committee for consideration.

The AAG Honors will be presented at the upcoming AAG Annual Meeting in Chicago, Ill., during a special awards luncheon on Saturday, April 25, 2015.

The AAG Honors will be presented in the following categories (select a name to view citations):

### AAG Lifetime Achievement Honors:

John P. Jones, III, University of Arizona  
Bobby Wilson, University of Alabama

### AAG Distinguished Scholarship Honors

Tony Bebbington, Clark University  
Ruth DeFries, Columbia University

### AAG Gilbert White Public Service Honors:

Elizabeth Oglesby, University of Arizona

### AAG Ronald F. Abler Distinguished Service Honors:

John Frazier, Binghamton University, State University of New York

Rita Gardner, Royal Geographical Society (with the Institute of British Geographers)

### AAG Gilbert Grosvenor Geographic Education Honors:

Michael Solem, Association of American Geographers

## University of California Press Selected for AAG Publication Award

### Association of American Geographers

The University of California Press is awarded the Association of American Geographers' Publication Award in recognition of their long-term support of geographic scholarship and publishing and overall excellence in publishing.

UC-PressThe relationship between the University of California Press and the discipline of geography goes back over a hundred years. Their University of California Publications in Geography series began in 1913. They published many of the major works of prominent geographer Carl Ortwin Sauer, a member of the University of California-Berkeley faculty and past President of the Association of American Geographers. And they continue to publish cutting-edge work in geography, spanning the discipline from physical to critical human geography.

Today, the geographic works published by the University of California Press are recognized with major awards, including the Association of American Geographers own Meridian Book Award, the John Brinckerhoff Jackson Prize, and Globe Book Award for Public Understanding of Geography. For example, their *Atlas of Yellowstone* (2012) has been recognized with no less than four publication awards.

For their long-term commitment to publishing excellent research in geography, we honor the University of California Press.

## Geoscience Publishing Awards Presented in Vancouver

### Shaun Hardy

### Geoscience Information Society

Three awards for excellence in geoscience publishing were presented by the Geoscience Information Society (GSIS) at its 2014 annual meeting in Vancouver, British Columbia in October.

Treatise on Geochemistry, 2nd edition, edited by Heinrich D. Holland (Harvard University) and Karl K. Turekian



(Yale University), received the Mary B. Ansari Best Reference Work Award. The 16-volume compendium was published by Elsevier in 2013. The first edition of the Treatise, also published by Elsevier, was honored with the Ansari Award in 2004. In choosing the second edition for the 2014 Award, the selection committee noted the significant amount of new material in the form of several new chapters and the extensive revision of other chapters to reflect current research.

Barbara Sherwood Lollar (University of Toronto), president of the Geochemical Society and editor of the environmental geochemistry volume of the Treatise, accepted the Ansari Award on behalf of the late editors-in-chief. The Ansari Award has been presented annually since 1988 and honors an outstanding reference work in the field of geoscience information published during the previous three years.

The Geology of Newfoundland Field Guide: Touring Through Time by Martha Hickman Hild received the 2014 Best Guidebook Award. Noting its accessibility for geologists and non-geologists alike, the GSIS Guidebooks Committee praised the work for its enjoyable writing style, high quality illustrations, inclusion of geographic and GPS coordinates, walking directions, and clear organization. Hickman Hild is a geologist and science writer based in Flatrock, Newfoundland. Her book was published in 2012 by Boulder Publications, Portugal Cove, Newfoundland. The Best Guidebook Award was established by GSIS to recognize and promote excellence in this important type of geoscience literature. The recipient is chosen annually by the GSIS Guidebooks Committee, which publishes Guidelines for Authors, Editors, and Publishers of Geologic Field Trip Guidebooks, an outline of best practices in the field. Linda Musser (Pennsylvania State University) delivered the citation and read a statement of acceptance from the author.

The recipient of the 2014 Best Paper Award was Shaun Hardy (Carnegie Institution for Science) for his publication "Open access publishing in the geosciences: Case study of the Deep Carbon Observatory." The paper appeared in Geoscience Information Society Proceedings, volume 43, pages 73-81. Award committee chair Nancy Sprague (University of Idaho) stated that "this concise, well-written article was selected for having broad significance in improving our understanding

of open access publishing in the geosciences, current attitudes among researchers about open access, and the roles geoscience librarians can play in helping increase awareness of open access options." The award recognizes the best paper published in the field of geoscience information during the previous year.

The Geoscience Information Society is an international professional organization devoted to improving the exchange of information in the earth sciences. The membership consists of librarians, editors, cartographers, educators, and information professionals. Information about the Society may be found at its website [www.geoinfo.org](http://www.geoinfo.org).

## AAPG - Annual Convention and Exhibition

**May 31 - June 3, 2015**

**Denver, CO USA**

Online registration is now open for the AAPG Annual Convention and Exhibition, which will be held May 31-June 3 in Denver at the Colorado Convention Center.

"Exploring the Summit of Petroleum Geosciences" is this year's theme, and organizers have compiled a program that features more than 900 technical presentations, 18 short courses and 13 field trips to present a comprehensive experience.

### **Other highlights will include:**

- Hundreds of feet of core from major petroleum plays will be on display at the core poster sessions.
- Author Simon Winchester celebrating the 200th anniversary of "The Map That Changed the World" will be featured at the All-Convention Luncheon.
- Former U.S. Geological Survey senior scientist (and AAPG member) Tom Ahlbrandt will be presenting this year's Halbouty Lecture, "From Petroleum Scarcity to Abundance: Opportunities and Implications for the U.S. and the World."
- Several special technical sessions will be held, including the next two installments of AAPG's "Discovery Thinking" forum series – one on Global Discoveries, and one on North America Discoveries.
- A special "Town Hall Meeting" titled "The Department of Energy Crosscutting Subsurface Initiative: Adaptive Control of Subsurface Fractures and Flow."
- Three Division luncheons are planned, offering topics such as Alberta's Oil Sands, the "Evolution of Unconventional Oil Plays" and "Can Unbiased Science Prevail?"
- The opening session and awards ceremony, where the best of AAPG will be honored. Among the honorees will be veteran geologist Paul "Mitch" Harris, who will receive the AAPG Sidney Powers Award, AAPG's highest honor, and Alfredo Guzmán, winner of this year's Michel T. Halbouty Leadership Award.
- An exhibit hall featuring more than 250 companies who will display the latest in technology, science and services.

To register or for more information, go to: [ace.aapg.org/2015](http://ace.aapg.org/2015).

## AAPG/SEPM Annual Meeting

### SEPM Events at the AAPG ACE & SEPM Annual Meeting

**May 31-June 3, 2015**

**Denver, CO USA**

Register at <http://ace.aapg.org/2015>

### The 2015 SEPM Annual Meeting Organizing Committee

- SEPM Vice Chair- - Robert Cluff
- SEPM Field Trip Chair - Ryan Sharma
- SEPM Short Course Chair - Howard Harper
- SEPM Awards (Judging) Chair - Jennifer Aschoff
- SEPM Sponsorship Chair - Howard Harper

### SEPM Short Courses

- SC 4 - Sequence-Stratigraphic Analysis of Mudstones: Key to Paleoclimate Archives, Subsurface Fluid Flow, and Hydrocarbon Source. Date: Saturday, May 30, 2015
- SC 8 - Sequence Stratigraphy for Graduate Students. Dates: Saturday and Sunday, May 30-31, 2015
- SC 14 - Seismic Geomorphology and Seismic Stratigraphy: Extracting Geologic Insights from 3D Seismic. Data. Dates: Sunday, May 31, 2015.
- SC 15 - Microbialites and Lacustrine Depositional Systems. Date: Sunday, May 31, 2015.
- SC 18 - Mudrock Petrology and Pore-Scale Imaging. Date: Thursday, June 4
- FT 2 - Paleontology and Volcanic Setting of the Florissant Fossil Beds. Dates: Saturday, 30 May, 7:00 a.m. - 7:00 p.m.

### SEPM Field Trips

- FT 6 - Geology of Exposures along the Rocky Mountain Front Range, Morrison to Golden, Colorado, Including Stratigraphy, Environments of Deposition, Structure, Paleontology and Economic Geology. Dates: Sunday, 31 May, 8:00 a.m. - 5:00 p.m.
- FT 7 - Reservoirs and Traps of the Laramide Rockies Petroleum System. AAPG Student Chapter/SEPM Student Field Trip. Dates: Wednesday, 3 June, 2:30 p.m. - Friday, 5 June, 8:00 p.m.
- FT 8 - Wasatch-Green River Fluvial-Lacustrine Field Trip, Piceance and Uinta Basins, Colorado and Utah. Dates: Wednesday, 3 June, 3:30 p.m. - Sunday, 7 June, 3:30 p.m.



- FT 11 - From Seaways to Gasways: The last 100 million years in the Denver Basin. Dates: Thursday, 4 June, 8:00 a.m. - 5:00 p.m.
- FT 14 - Mechanisms of Petroleum Generation: Geochemical Field Trip & Lab Demonstration Focusing On the Green River Petroleum System, Uinta Basin, Utah. Dates: Thursday, 4 June, 8:00 a.m. - Sunday, 7 June, 4:00 p.m.

## **SEPM Special Activities (in addition to the SEPM sponsored Technical Sessions)**

### **Sunday**

Ice Breaker, 5:00 pm - 7:30 pm, SEPM Booth, Exhibit Hall

### **Monday**

SEPM Research Symposium

Poster Session (All day)

AAPG/SEPM Student Reception

6:00 pm - 8:00 pm, Hyatt Regency

SEPM Research Groups, 7:00 pm - 10:00 pm, Grand Hyatt

### **Tuesday**

SEPM Research Symposium

Oral Sessions (All Day)

SEPM Luncheon

12:00 pm - 1:00 pm

Joe Macquaker - "Diagenesis: The underappreciated factor controlling mudstone variability..."

SEPM President's Reception and Awards Ceremony

7:00 pm - 9:00 pm, Grand Hyatt.

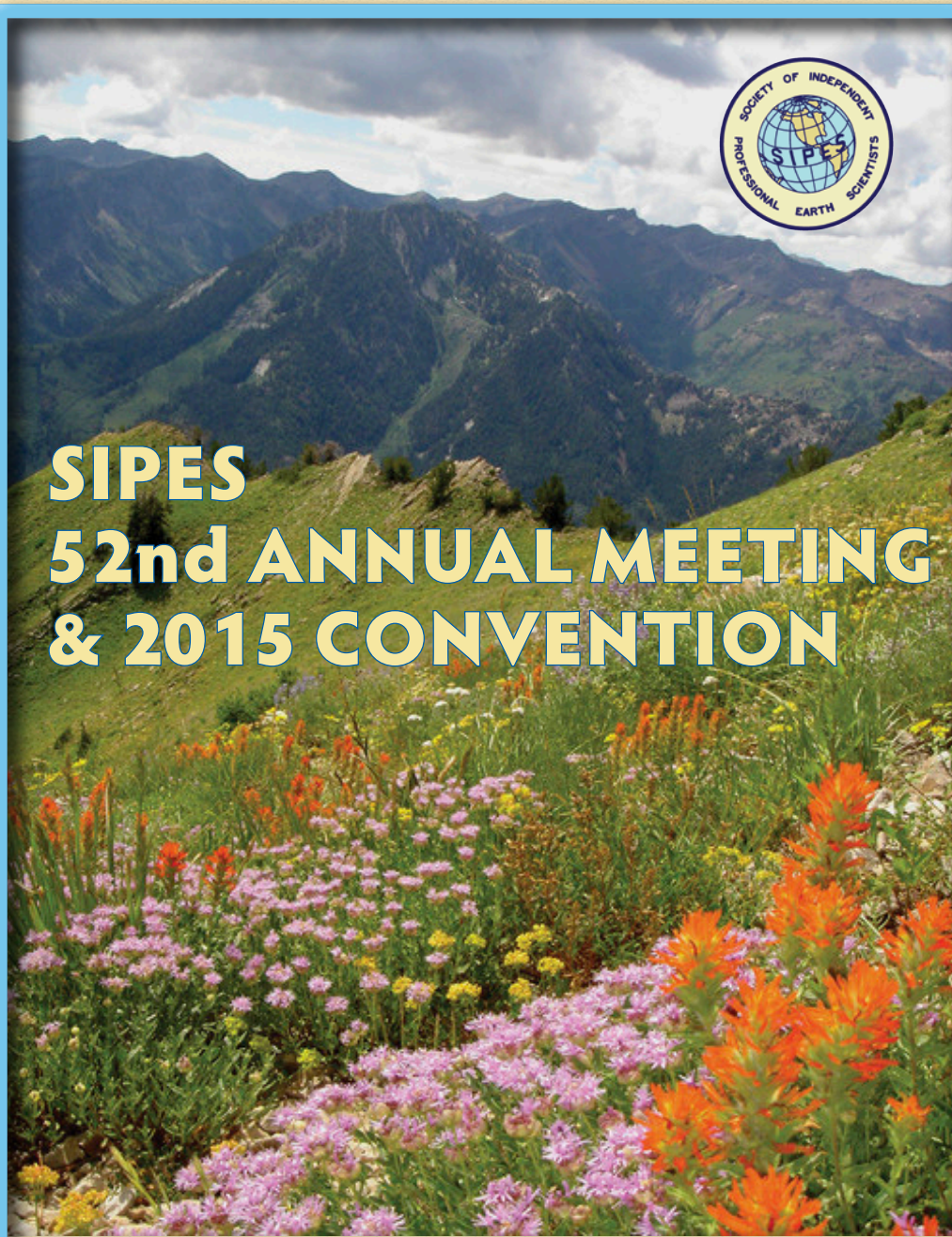


**Hong Kong SAR, China**  
**June 14-18, 2015**

Asia is home to the majority of mankind and is increasingly the center of the global economy, yet it remains vulnerable to changes in monsoon intensity through time. The archaeological record suggests that the settlement of this continent and the thriving and demise of urban civilizations has been influenced, at least in part, by past changes in the strength and variability of summer rains. Despite improved modern technology, the need for water for agriculture, for human consumption, and for industrial uses means that the supply of water, which is often dominated by the summer rains, remains crucial to supporting populations.

The objective of this conference will be to examine in detail the geological and historical records of climate change and assess how past climate change has exerted pressure on human development, and understand how and why the climate has changed. By summarizing what is known about the controls on the monsoon climate we aim to estimate how this phenomenon might change in the near future under the pressure of global climate change. Bringing together climate and geological scientists, archaeologists, economists, and policymakers, we aim to understand how mankind and the monsoon have evolved together in the past and what can be done to mitigate future changes in the environment. We aim to provide discussion and input to policy stakeholders prior to the 2015 United Nations Framework Convention on Climate Change (UNFCCC), which will be held in Paris, France.

**Society of Independent Professional Earth Scientists**



## **SIPEs 52nd ANNUAL MEETING & 2015 CONVENTION**

### **DEER VALLEY, UTAH**

### **JUNE 15-18, 2015**

Co-Hosted by the SIPEs National Organization & SIPEs Austin and San Antonio Chapters



## SIPES 2015 Convention at a Glance

### Monday June 15

8:00-9:45 a.m.  
SIPES Foundation BOD  
Meeting & Continental  
Breakfast

8:30 a.m.-5:00 p.m.  
Registration

10:00 a.m.-2:00 p.m.  
SIPES BOD Meeting

10:00 a.m.-12:00 p.m.  
Chapter Chairmen's  
Meeting

10:00 a.m.-12:00 p.m.  
SIPES Presidents'  
Council Meeting

12:00-1:00 p.m.  
Lunch for Board of  
Directors, Chapter  
Chairmen, & Past  
Presidents

1:30-5:00 p.m.  
Hospitality Suite Open

2:30-5:00 p.m.  
SIPES Foundation  
Seminar: "Discovering  
Dinosaurs in Utah: 150  
Million Years of Earth  
History" by Dr. Randall  
Irmis, Natural History  
Museum of Utah

6:00-7:30 p.m.  
Icebreaker

### Tuesday June 16

8:30 a.m.-4:30 p.m.  
Registration

8:30-11:45 a.m.  
Technical Sessions

9:00 a.m.-12:30 p.m.  
Stewart Falls Hiking  
Excursion

9:00 a.m.-4:30 p.m.  
Hospitality Suite Open

10:00 a.m.-3:00 p.m.  
Heber Valley Railway  
Excursion

10:30 a.m.-2:30 p.m.  
Utah Olympic Park Tour

12:00-1:15 p.m.  
All-Convention Luncheon  
& Annual Business  
Meeting

12:30-3:30 p.m.  
Park City Culinary Tour

1:30-4:00 p.m.  
Park City Horseback  
Riding

1:30-4:30 p.m.  
Mountain Biking  
Excursion

1:30-5:00 p.m.  
River Rafting Trip

1:30-5:15 p.m.  
Technical Sessions

4:15-5:15 p.m.  
Ethics Course

6:30-9:30 p.m.  
SIPES Awards Banquet

### Wednesday June 17

8:30 a.m.-12:00 p.m.  
Registration

8:30-11:45 a.m.  
Technical Sessions

9:00 a.m.-12:00 Noon  
Mountain Biking  
Excursion

9:00 a.m.-4:30 p.m.  
Hospitality Suite Open

10:00 a.m.-3:00 p.m.  
Salt Lake City, Temple  
Square & Great Salt  
Lake Tour

12:30-4:30 p.m.  
Sundance Resort Tour

12:30-5:00 p.m.  
Utah Fishing Expedition

1:30-4:30 p.m.  
Guided Mountain Hike

1:30-5:00 p.m.  
Natural History  
Museum of Utah Tour

6:30-9:00 p.m.  
Cornerstone Group  
Reception  
(by invitation only)

### Thursday June 18

9:00 a.m.-4:00 p.m.  
Post-Convention Field  
Trip to Central Wasatch  
Range and Park City  
led by Dr. Ron Harris,  
Brigham Young  
University

### SOCIETY OF INDEPENDENT PROFESSIONAL EARTH SCIENTISTS

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Telephone 214-363-1780 • Fax 214-363-8195 • Email [sipes@sipes.org](mailto:sipes@sipes.org)

# JUNE/JULY MEETINGS



## Accommodations and Registration

A block of hotel rooms has been reserved for symposium attendees at the Westin St. Francis on Union Square, in the heart of the shopping, financial, and scenic areas of San Francisco. Guests can walk to cable cars and trolleys that go to Chinatown, Fisherman's Wharf, and the Alcatraz ferry. The San Francisco and Oakland Airports are easily accessible from the hotel by train. The Westin has made rooms available to symposium delegates at a very favorable rate.

Professional Development Hours (PDH) will be available for the symposium.

Information on symposium registration, exhibition, accommodation and sponsorships can be found at [www.armasymposium.org](http://www.armasymposium.org) or by contacting Peter Smeallie, Executive Director, ARMA, [info@armarocks.org](mailto:info@armarocks.org), 703-683-1808.



600 Woodland Terrace  
Alexandria, VA 22302

## June 28 - July 1, 2015 San Francisco, CA USA

Register Online at:

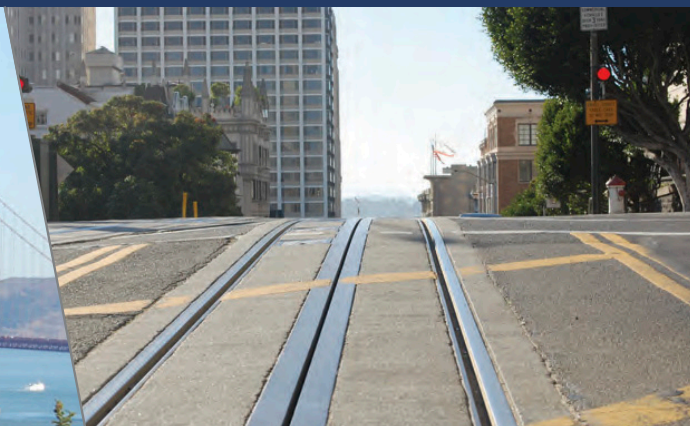
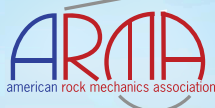
**[www.ARMASymposium.org](http://www.ARMASymposium.org)**

Register by May 2015 and save on the registration fee!



CALL FOR PAPERS 2015, SAN FRANCISCO, CA

SPONSORED BY



## CALL FOR PAPERS

THE WESTIN ST. FRANCIS, UNION SQUARE  
SAN FRANCISCO, CA

49<sup>th</sup> US Rock Mechanics/Geomechanics Symposium



San Francisco • 2015 • June 28-July 1

## Invitation to San Francisco

The American Rock Mechanics Association invites you to its 49th US Rock Mechanics/Geomechanics Symposium to be held in San Francisco, California, USA on 28 June-1 July 2015. The 2015 program will focus on new and exciting advances in rock mechanics and geomechanics. San Francisco is one of the country's most dynamic cities. Home to some of the world's most innovative companies (Silicon Valley is nearby), San Francisco is known for its beautiful hills and views, its world-class restaurants, and its sophisticated cultural institutions. The symposium will be held at the Westin St. Francis on Union Square in the heart of the city.

Technical tours and field trips are being planned. Sightseeing tours will include various city landmarks, social activities and other attractions. Short courses and workshops will be held immediately prior to the symposium and will be listed as they are confirmed. Details will be provided on the symposium web page as they become available.

## Subject Areas

This symposium encompasses all aspects of rock mechanics, rock engineering, and geomechanics. We invite scientific and engineering papers in:

- Petroleum engineering,
- Civil engineering,
- Geology and geophysics,
- Mining engineering, and
- Underground construction.

Further details will be provided on the symposium web page as they become available.

## Organizing Committee

Alvin Chan	Shell
Bill Dershowitz	Golder Associates
Russell Detwiler	University of California, Irvine
Wayne Gibson	Gibson Group Management
Greg Hasenfus	CONSOL Energy
Haiying Huang	Georgia Institute of Technology
Ghazal Izadi	Baker Hughes
Joseph Morris (Chair)	Lawrence Livermore National Laboratory
Azadeh Riahi	Itasca Consulting Group
Marisela Sanchez-Nagel	OilField Geomechanics
Peter Smeallie	ARMA

## Abstract Submission

Abstracts of 250-500 words, in English, can be submitted online at <http://www.armasymposium.org>. Abstracts should include a brief description of work performed, results, and significance. Figures may be included as necessary to explain the abstract. All abstracts and accepted papers will be peer-reviewed by experts in respective subject areas through an online process. To facilitate travel arrangements, invitation letters to attend and participate in the symposium may be issued upon request after acceptance of an abstract. A presentation slot will be tentatively assigned at that time, with final confirmation after approval of the paper.

### Deadlines for abstract and paper submittal are as follows:

- 1 November 2014—Abstract submittal
- 15 January 2015—Notification to authors
- 1 March 2015—Paper submittal



**THE SYMPOSIUM ENCOMPASSES ALL ASPECTS OF ROCK MECHANICS, ROCK ENGINEERING, AND GEOMECHANICS.**

**The focus of the symposium is on fundamental, practical and educational issues facing our profession. Topics of interest include, but are not limited to:**

- Rock mass characterization
- Rock physics and geophysics
- Unconventional resources development
- In-situ stress and pore pressure prediction and measurements
- Geomechanics for injection, production and depletion of reservoirs
- Reservoir stimulation and monitoring technologies
- Carbon sequestration and utilization
- Induced/triggered seismicity and monitoring micro-seismicity
- Hazards and hazard mitigation, rock slides
- Geothermal and hydrothermal advancements
- Waste disposal, seal integrity, underground storage
- Complexity of subsurface reservoirs/fault zones/fractured media
- Fracture mechanics and fracture propagation
- Mining and geology of rare earth element ores and other critical materials
- Slope and open pit stability, foundations, dams
- Stability/support of underground openings
- Numerical/analytical/constitutive modeling of rock and rock processes
- Rock excavation and breakage, dynamic loading
- Education in rock mechanics and geomechanics
- Novel laboratory and field equipment and testing
- Data visualization
- High performance computing and big data challenges
- Weak rocks, shales, problem geomaterials, granular materials
- Fluid flow and transport through fractured porous media
- Coupled processes, heat, flow and transport
- Geochemical/biogeochemical influences on rock properties and fluid flow
- Uncertainty quantification, optimization and risk assessment



## **Euroclay2015** **Edinburgh Scotland, U.K.** **July 5-10, 2015**

Euroclay 2015 - the quadrennial meeting of the European Clay Groups Association (ECGA) jointly with the annual meeting of The Clay Minerals Society (CMS) and in association with the International Natural Zeolite Association (INZA) and the Geological Society.

### **To be held at Edinburgh University, Appleton Tower, 5th-10th July 2015.**

Organized by The Clay Minerals Group of the Mineralogical Society of Great Britain & Ireland and The Clay Minerals Society.

- The scientific program of EUROCLAY 2015 will bring together, in an exciting, leading-edge programme, specialists from different disciplines related to clays and clay minerals. It will consist of technical sessions of both oral and poster presentations with a generous quota of invited speakers who are the leaders in their respective fields. Pre-meeting workshops and mid-meeting field excursions will be integral parts of the scientific program.
- A key aim of this conference will be to integrate industrial and academic workers, with sessions which cover both areas.
- A visit to Edinburgh is one of life's 'must-do' items. As Scotland's capital city, it is the home of geology and is littered with places of interest for the delegate and accompanying person alike.



# EARTH EDUCATORS' RENDEZVOUS

**Boulder, CO USA  
July 13-17, 2015**

## **Rendezvous Overview**

The 2015 first annual Earth Educators' Rendezvous will bring together researchers and practitioners working in all aspects of undergraduate Earth education. We welcome faculty from all disciplines who are interested in improving their teaching about the Earth, administrators from geoscience departments and interdisciplinary programs that want to become stronger, and education researchers of all types. Join the Rendezvous for 2 or 3 days or stay the whole week.

## **Themes**

The Rendezvous will help us individually and collectively address the suite of interrelated challenges faced by undergraduate Earth Education today:

- developing students' higher order geoscientific skills, from data analysis to critical thinking to effective communication
- increasing the number and diversity of students who learn about Earth
- collaborating with colleagues across the disciplines to situate learning about Earth in a societal context
- supporting current and future teachers in successfully implementing the Next Generation Science Standards
- preparing competitive graduates who move easily into and within the broad and changing geoscience workforce
- pursuing education research that supports our ability to address these challenges

## **Program**

The Earth Rendezvous program will bring together these themes into a rich tapestry of workshops, contributed talks and posters, plenary sessions, and working groups. Drawing across the work currently taking place in geoscience, environmental, and sustainability education, meeting attendees will have the opportunity to learn broadly, focus on a particular issue or challenge, or something in between. All are invited to submit abstracts to the contributed program of posters and short presentations.

Morning workshops and working groups will meet for two or three days. Workshops are interactive with participants learning from experts and from one another in formats that build on research-based pedagogies. They provide an opportunity each day to synthesize ideas from the afternoon sessions and put them to use in your own

institutional context. These sessions feature time to work on your own introductory or upper-division course, to plan new ways to strengthen your program, or to focus on a particular teaching skill.

The extended lunch hour provides an opportunity to see what is going on in the community around you and to network. Each day, a poster session will provide stimulation for conversation with colleagues old and new.

Each afternoon you can pick from a set of themed sessions with contributed presentations or a short workshop. These sessions allow you to sample areas where you have specific needs or interests. Sessions will range from a focus on teaching a topic (e.g. climate change or earthquake hazards) or technique (e.g. flipping your class) to a broad challenge faced by our community (e.g. increasing the diversity of your graduates or building connections with industry). A technical program committee will select presentations and will arrange them into a set of themed sessions.

The formal program will end each day with a plenary speaker providing a common experience for all participants and an opportunity to hear from someone typically beyond our reach at smaller-scale functions. Then, the streets of Boulder beckon with venues for informal networking and fun with colleagues.

We invite research groups or working groups to meet jointly with the Rendezvous and have reserved space for these activities.

## Expectations

Participants will be asked to prepare in advance for their workshops, to attend all sessions of the workshop for which they are registered, and to participate fully in the workshops and the Rendezvous.

## Dates

The Rendezvous will begin at 8:30 a.m. on Monday July 13 and end at 5:00 p.m. on July 17. Early arrivals can join together for a no-host evening at a local establishment. Morning workshops will last three days (beginning on Monday), two days (beginning on Thursday) or five days. Participants can register for any number of days however, your fifth day is free!

- Registration and Abstract Submission
- Late Abstract poster submissions: May 15, 2015 (or until remaining spots are full)
- Early Registration Deadline: Passed April 13, 2015
- Late Abstract Submission Registration Presenter Guidelines

We welcome participation by all who are interested in teaching and learning about the Earth including faculty and administrators from two-year and four-year colleges and universities, teachers of high school Earth science, faculty in all disciplines who teach about some aspect of the Earth or would like to incorporate such teaching in the future, students and post-docs interested in these topics, and program leaders in geoscience, environmental science, environmental studies, sustainability, or other programs with an Earth component. All participants are invited to submit an abstract to be considered for inclusion in the contributed program of short presentations and posters. An NAGT membership will provide a \$100 registration discount. Also, there will be a \$20/day group discount and a \$20 research meeting discount (research groups application passed February 16th) to receive the \$20/day discount). A limited number of travel stipends are available for those with a financial need (application deadline has passed).

**For more information, or to register:** [http://serc.carleton.edu/earth\\_rendezvous/2015/index.html](http://serc.carleton.edu/earth_rendezvous/2015/index.html)



## NSS 2015: A Hitchhiker's Guide to Missouri Caving

Waynesville, MO USA

July 13-17, 2015

### Call for Abstracts

If you are interested in presenting at one of the sessions during the NSS 2015 Convention, please contact the appropriate person listed on the [sessions contact list](#). Abstracts may be no more than 250 words in length (this limit must be strictly met). In addition to the text, the abstracts should contain the title of the paper, and the name(s), address(es), and email address(es) of the author(s). The abstracts should be informative summaries that include the conclusions and not the lists of topics that "...will be discussed." Bibliographies and references should not be given in the abstracts. The deadline is May 15th. Early submissions are encouraged. Many sessions fill quickly and unfortunately may not be able to accommodate all would-be presenters. If you have additional questions please contact the chair for the session(s) that you are interested in or contact DJ Hall at [programs2015@caves.org](mailto:programs2015@caves.org).

- What's the first rule for caving in the state of Missouri? --DON'T PANIC!
- The second rule is, always bring a towel.

The theme for the 2015 NSS Convention is: A Hitchhiker's Guide to Missouri Caving. Whether you're from nearby St. Louis, flying in from Australia, or transporting from a far off galaxy, the 72nd annual NSS Convention promises to be one cavers will remember long after the mud is toweled away.

The 2015 NSS Convention will take place July 13-17 in Waynesville, located in picturesque Pulaski County Missouri, about a two-hour drive southwest of St. Louis. We're confident that cavers from across the country will take advantage of the convenient, centralized location and come enjoy caving, camaraderie, and the natural beauty to be found in the Missouri Ozarks.

### "Hey, want to go for a trip in my cave passage?"

If you're looking to get underground, the 2015 NSS Convention will not disappoint. With hundreds of caves located within a one-hour drive, there will be plenty of guided as well as self-led cave trips to choose.

### "Don't forget to bring a towel!"

Special features unique to the 2015 NSS Convention will include cave diving trips as well as float trips on local creeks and rivers.

If you're more interested in the social aspect of Convention week, DON'T PANIC --we've got more fun and activities than one person can fit in the time you'll be there. This includes contests, salons, lectures, scientific workshops, guided and self-guided driving tours, time-travel demonstrations, and live entertainment every night of the Convention! (...we're just kidding about the time travel --or ARE WE?)

Facilities for the 2015 NSS Convention will include the Shriner's Club Ft. Wood Campground, which has acres of space, on-site pavilions, electricity, shower houses, shaded tent sites, and pull-through RV camping spots. Waynesville High School offers state-of-the-art technology in every room for educational sessions, salons, and workshops.

The Pulaski County Tourism Bureau will be providing plenty of options for sightseeing, lodging, and discovering the rich history and lore of the region.

Whether you're parachuting to the site from an airplane, driving there in your car, transporting from your spaceship, or hitchhiking via the back roads, the 2015 NSS Convention, a Hitchhiker's Guide to Missouri Caving, promises to be one of the best ever!

## For Convention registration information:

The staff of the 2015 NSS Convention is very excited about our upcoming event. We warmly welcome you to the Missouri Ozarks --and to the Galaxy!

For Convention Registration Information: <http://nss2015.caves.org/registration.shtml>

The National Speleological Society  
6001 Pulaski Pike Huntsville, AL 35810-1122 USA  
(256) 852-1300  
[nss@caves.org](mailto:nss@caves.org)  
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Santa Fe, NM USA  
July 27-31, 2015

This Chapman Conference will bring together scientists from a wide range of backgrounds to explore and summarize the state of the science and identify future research directions relevant for the problem of tropical widening. A particular emphasis will be on the multidisciplinary nature of the problem with the goal of enabling cross-fertilization among the wide range of climate science subtopics represented by conference participants. To facilitate this, the following four session topics are planned:

- What determines the width of the tropical belt?
- How and why has the tropical width changed in the past?
- How and why might the tropical width change in the future?
- What are the impacts for the oceans, cryosphere, hydrologic cycle, human society, and ecosystems?
- For more information: <http://chapman.agu.org/tropics/>

## Pore Scale Geochemical Processes: Mineralogical Society Short Course

**Prague, Czech Republic**  
**August 15-16, 2015**

The pore scale is readily recognizable to geochemists, and yet in the past it has not received a great deal of attention as a distinct scale or environment that is associated with its own set of questions and challenges. Is the pore scale merely an environment in which smaller scale (molecular) processes aggregate, or are there emergent phenomena unique to this scale? Is it simply a finer grained version of the “continuum” scale that is addressed in larger scale models and interpretations? We would argue that the scale is important because it accounts for the pore architecture within which such diverse processes as multi-mineral reaction networks, microbial community interaction, and transport play out, giving rise to new geochemical behavior that might not be understood or predicted by considering smaller or larger scales alone.

Fortunately, the last few years have seen a marked increase in the interest in pore scale geochemical and mineralogical topics, making a Reviews in Mineralogy and Geochemistry volume on the subject timely. This RiMG volume 80 will include contributions that review experimental, characterization, and modeling advances in our understanding of pore scale geochemical processes. Characterization approaches to be considered will include X-ray synchrotron techniques, Small Angle Neutron Scattering (SANS), Backscattered Electron (BSE) mapping, and FIB-SEM mapping of pore structure. Experimental studies to be reviewed include those making use of micro-model and/or microfluidic approaches that quantify geochemical, or coupled geochemical transport processes. In addition, several of the most important pore scale modeling approaches, including Direct Numerical Simulation and Lattice Boltzmann methods, as well as the coarser-grained approaches based on pore network methods and microcontinuum models, will be reviewed. The volume will also review recent research on the pore-size dependence of reaction rates, as well as the thermodynamic and kinetic factors that influence geochemistry in nano-confined pores.

The audience for the proposed volume will be graduate students, post-doctoral associates, and professionals in the fields of geochemistry, environmental science and engineering, hydrology, and geophysics. Since the pore scale is central to many of these disciplines, we expect a wide and large audience across the Earth and Environmental sciences.

For more information: <http://www.minsocam.org/msa/sc/>



**PRAGUE, CZ**

**AUGUST 16 - 21  
2015**

The success of the conference is the result of the energy and enthusiasm of the scientists who attend to share their work, and to learn from their colleagues. There are many ways that scientists can be involved in the conference, but the most important is submitting an abstract and presenting your work at the conference. Register before 16th June to take advantage of early bird prices. Please join us at some of the events and activities that surround



the conference: workshops are available to teach exciting new skills; field trips visit local areas of geochemical and cultural interest; social events encourage friendship between all scientists.

Goldschmidt2015 will be held in the Prague Congress Centre, located in one of the most beautiful cities in Europe. Prague Congress Centre is one of the dominant points of the City of Prague. It is located on one of Prague's hills, which provides visitors with a beautiful view of the world famous Prague panorama where the silhouette of Prague Castle, together with a myriad of towers belonging to churches, cathedrals, palaces and ancient buildings from the historical centre, rise over the Vltava River and extensive parks. The Prague Congress Centre is one of the largest and best-equipped European centres and allows us to have all talks, posters, exhibitors and refreshments under the same roof. Easily accessible by the metro underground trains, the congress centre forms an ideal location for Goldschmidt2015.

For more information: <http://goldschmidt.info/2015/>

**SEG EVENTS | [segweb.org/events](http://segweb.org/events)**



SEG

[www.segweb.org](http://www.segweb.org)

## The Geology and Geochemistry of Gold Deposits Workshop

SGA Conference | Nancy, France | 2-day-Pre-Conference Workshop | August 22–23, 2015

### DESCRIPTION

This workshop is for geologists from academia and industry who want to improve their understanding about the geology and genesis of gold deposits. The course will provide a comprehensive overview of all aspects of the geology of gold ores in both arc environments and metamorphic terranes. Aspects of the geology, geochemistry, mineralogy, alteration, structure, tectonics, and exploration approaches will be covered for the main gold deposit types of interest to explorationists.

**Day 1:**

- Gold deposit models
- High and low sulfidation epithermal gold deposits
- Gold-bearing porphyry deposits
- Gold-bearing geothermal systems

**Day 2**

- Characteristics of orogenic gold
- Orogenic gold in space and time
- Carlin-type gold deposits
- Reduced intrusion-related gold systems

Contact for additional information:  
Richard Goldfarb ([rggoldfarb@mac.com](mailto:rggoldfarb@mac.com))

Number of participants: Minimum: 25; Maximum: 60

**REGISTER at**  
[sga2015.blog.univ-lorraine.fr/registration/](http://sga2015.blog.univ-lorraine.fr/registration/)

### PRESENTERS



■ **Richard J. Goldfarb**  
Senior research geologist with the U.S. Geological Survey. His major expertise is in the area of the geochemistry and geology of ore deposits, with emphasis on Phanerozoic orogenic gold.



■ **Stuart F. Simmons**  
Research Professor at EGI-University of Utah and Consulting Geoscientist at Hot Solutions with more than 30 years of research experience on hydrothermal processes, epithermal mineralization, and geothermal resources.

#### Early Registration *(through July 31, 2015)*

SGA/SEG (includes VAT):	
Member	495 €
Non members	645 €
Student members	125 €
Non member students	200 €

#### Late Registration *(after July 31, 2015)*

SGA/SEG (includes VAT):	
Member	595 €
Non members	745 €
Student members	200 €
Non member students	300 €

Please note that SEG reserves the right to cancel this event should minimum attendance numbers not be met by July 31, 2015.

**Nancy, France**  
**August 22-23, 2015**

For more information: <http://sga2015.blog.univ-lorraine.fr/registration/>

## IAH Congress

Rome, Italy

**September 13-18, 2015**

The main theme of the AQUA2015 Congress is summed up by the motto “Back to the Future”, linking the past use of water over 2000 years with the most advanced techniques of modern hydrogeological research. The Scientific Programme includes 8 main topics, attempting to answer challenging questions concerning the management of water resources in relation to food, health and the environment, the development of sustainable governance and policy and of new frontiers and new tools. The draft programme of the sessions, with descriptions and the list of convenors, is now available on the conference [website](#).

# SEPTEMBER MEETINGS



**PITTSBURGH, PA | SEPTEMBER 19-26, 2015**

*Below the steep slopes of Mount Washington created by three great rivers, the City of Pittsburgh blends its industrial heritage with its forward focus on technology. Throughout this dynamic urban landscape, past and present collide in land use, environmental impacts, and shifting economic forces. The AEG 2015 Annual Meeting Planning Committee invites you to join us for the "Conference at the Confluence".*

## WYNDHAM GRAND DOWNTOWN



Discover the 90 distinct neighborhoods of Pittsburgh Pennsylvania when you stay at the centrally located Wyndham Grand Pittsburgh Downtown.

The hotel is located in the Central Business District, also known as the Golden Triangle, at the meeting of the Allegheny and Monongahela Rivers to form the Ohio River. Where soaring skyscrapers and Pittsburgh's famous three rivers meet, an upscale hotel experience awaits in downtown.

## SPONSORSHIP & EXHIBITOR OPPORTUNITIES

Event sponsorship is effective advertising that builds lasting recognition and good will for your company. We anticipate over 500 professional registrants at AEG2015 in Pittsburgh! We also have a brand new, fully interactive mobile app that provides even more sponsorship opportunities, so be sure to check it out!

**NEW!**  
Cutting edge  
interactive app.  
Leave the paper behind  
and don't miss  
a thing!

## FIELD TRIPS, GUEST TOURS AND SPECIAL EVENTS

We have an exciting lineup of trips, tours and a very special event this year, an evening aboard the Gateway Clipper. Join us for a reception cruise and see the spectacular city skyline as the sun sets on the three rivers.

See our website for complete details:  
[www.aegannualmeeting.org](http://www.aegannualmeeting.org)



## CALL FOR ABSTRACTS

(Oral and Poster Presentations)

*Do not miss this opportunity to provide an oral or poster presentation at this year's meeting!*

**Abstract submission deadline is May 1, 2015**

Pittsburgh photo courtesy Roy Engelbrecht

To submit an abstract go to:

[www.aegannualmeeting.org](http://www.aegannualmeeting.org)

Username: AEG

Password: Pittsburgh2015

(DO NOT USE YOUR AEG MEMBERSHIP LOGIN)





# SEPTEMBER MEETINGS



## Call for Abstracts

**A**nchorage, Alaska is the destination for the American Institute of Professional Geologists (AIPG) 52<sup>nd</sup> National Conference, 'Fire and Ice! Members and non-members are invited to join AIPG and the AIPG Alaska section to engage, learn, and explore this amazing state and all it has to offer; unique and complex geology, northern flora & fauna, and breathtaking scenery!!

The 2015 meeting will be held at the Hilton Hotel in the heart of downtown Anchorage, with access to its rich history (Anchorage celebrates the 51<sup>st</sup> anniversary of the 1964 earthquake and its Centennial this year!), modern amenities (shopping and entertainment), plus quick access to some of the country's most incredible state and national parks.

The Alaska Section is looking forward to sharing the riches of Alaska with all of the meeting attendees and their family/guests with some fantastic field trips that will take you across much of Southcentral Alaska and north to Fairbanks. The appeal of Alaska speaks for itself, but to entice you just a bit more, a sampling of the field trips and activities planned include: Turnagain Arm Tour, Anchorage Geology Tour, Denali National Park and Healy Valley Coal Mine, Glacial Geology of the

Upper Kenai Peninsula, Wishbone Hill and Matanuska-Susitna Valley, and a pre-conference Fairbanks tour to include the Cold Regions Research and Engineering Laboratory (CCREL) permafrost tunnel and a tour of the Fort Knox Gold Mine. For more information on the conference go to [www.aipg.org](http://www.aipg.org).

Members and non-members are invited to submit an abstract for the technical sessions scheduled for Monday, September 21<sup>st</sup> and Tuesday, September 22<sup>nd</sup>.

### How To Submit an Abstract

To have your abstract considered for a presentation or poster, please go to <http://www.aipg.org/abstract/> to submit an abstract online by **May 18, 2015**. Abstracts must be in Word format, single spaced, 12 point Times New Roman, and should not exceed one page. No tables or pictures will be accepted. You will be notified by **June 5, 2015** if your abstract has been accepted. Authors who wish to publish a paper in AIPG's "The Professional Geologist" (TPG) can contact AIPG for additional information at [aipg@aipg.org](mailto:aipg@aipg.org).

### Call for Abstracts Important Dates

May 18, 2015 ..... Abstracts Due  
June 5, 2015 ..... Authors Notified

### Abstract Subject Areas

(Suggested topics welcome)

- Climate Change
- Coastal Processes
- Earth Science Education
- Earthquake Hazards/Seismology in Alaska
- Energy
- Engineering Geology
- Environmental Geology
- Geochemistry
- Geologic/Natural Hazards
- Geology of Alaska
- Geophysics
- Geotechnical Engineering in Alaska
- GIS/Remote Sensing/LiDAR
- Glacial Geology
- Hydrology/Groundwater/Surface Water
- Mapping
- Mining/Industrial Minerals/Economic Geology
- Oil and Gas
- Other/Miscellaneous
- Paleontology
- Permafrost/Cold Regions/Arctic
- Professional/Legal
- Resource Development
- Social Licensing
- Transportation Projects
- Volcanology/Volcanic Hazards in Alaska
- Young Professionals

AIPG

12000 N. Washington St., Suite 285  
Thornton, CO 80241- (303) 412-6205

Hilton Anchorage Hotel, 500 West Third Avenue, Anchorage, AK 99501, (907) 272-7411 or 1-800-HILTONS

Photos by Nicole Geils and the ACVB

## TSOP 32<sup>nd</sup> Annual Meeting

Yogyakarta, Indonesia

September 20-27, 2015



The 32<sup>nd</sup> Annual Meeting of TSOP will be held in Yogyakarta, Indonesia from September 20 to 27, 2015, organized in cooperation with Gadjah Mada University. This meeting provides an opportunity to discuss different aspects of organic petrology in a special atmosphere in the heart of cultural centre of Java. Chance to have short courses related with organic petrology and unconventional hydrocarbon resources as well as field trip to peat forming environment in East Kalimantan is also offered.

### On the Edge: Hydrocarbons in the Tropics

The Indonesian Archipelago is vast, diverse and exciting. The culture is as deep and varied as it's geology and history. It is a region at the nexus, or on the edge if you will, of almost everything; and that includes hydrocarbon generation. Indonesia has been exploiting petroleum for almost two hundred years and coal mining goes back even further. Today, it is the world's top coal exporter. Thus, it is appropriate that the Society for Organic Petrology (TSOP) holds its 32<sup>nd</sup> Annual Meeting here in the ancient city of Yogyakarta, in central Java.

Appropriate to the setting, the theme of the conference is hydrocarbon generation in the tropics. Just about all of the hydrocarbons (oil, gas and coal) in Indonesia are sourced from Tertiary age sediments. The paleogeographic setting through out this time was strictly at the equator. Even today some of the largest peat deposits in the world occur on the islands of Sumatra and Borneo; understandably these have been used as modern analogues for coal formation throughout the scientific literature for decades. The mighty Mahakam River Delta, an area of vast oil and gas production, is yet another area often cited, quite literally, as a textbook example for deltaic processes and hydrocarbon accumulation.

The conference is structured around the journey that organic materials take from their initial accumulation in peat or organic-rich sediments, through diagenesis to its ultimate extraction as coal, gas or liquid hydrocarbon. We are encouraging researchers to think about their work in this context and submit their papers identifying where along this thread their work lies. There will undoubtedly be presentations looking at the abundant resources of Indonesia in this light, but we also expect and wish to facilitate presentations from elsewhere in the world.

### Presenters are encouraged to give talks on any of the following topics:

- Organic petrology and geochemistry of peat, coal and kerogen
- Coal geology and sedimentology
- Basin formation and thermal histories
- Coalbed methane and shale gas
- Petroleum geoscience and engineering
- Coal mining and beneficiation
- Coal and coke properties

# SEPTEMBER MEETINGS

- Coal combustion, liquefaction, and gasification
- Environmental, climate change and health impacts of coal and petroleum

## Program

There will be two full days of Technical Sessions (the 22nd and 23rd of September). Before the conference, there will be a field trip highlighting both the local geology and the culture of the Yogyakarta area; specifically, we'll visit Borobudur, which is the largest Buddhist temple in the Southern Hemisphere and is a World Heritage Site. The temple was originally built in 825 AD and rediscovered in the early 1800s. We'll finish off the day with a visit to a family run batik shop where we'll be able to see the different kinds of batiks being made and a chance to buy as many as we please!

Also, before the conference, there will be two workshops, held concurrently. The first is an Introduction to Organic Petrology. This course is designed as an introduction to organic petrology and is aimed at students, but will also be informative to technical and non-technical persons who work with coal. The two presenters are Drs Walter Pickel and Joan Esterle. Both Walter and Joan have given this course previously and we thank them for reprising their efforts for this conference. The second workshop is an Introduction to Reserve and Resource Assessments and is designed as an introduction to unconventional reserve determinations and is aimed at reservoir and reserve engineers and geologists. The two presenters, John Hattner and Dan Paul Smith are from Netherland Sewell & Associates Inc and are recognized experts in this field.

Finally, there will be a 3-4 day post-conference field trip to the eastern part of Borneo to examine modern and ancient hydrocarbon formation. From Yogyakarta we'll take a 2 hr flight to Balikpapan in East Kalimantan (one of four Indonesian provinces in Borneo). We'll examine Miocene age sediments, which are mostly fluvial to near marine; these contain abundant coal seams and are the source of all the gas and liquid hydrocarbons in the area. The Mahakam Delta will also be explored while we examine some of the modern processes we have all read about, but few visited. Finally, a visit to a modern peat mire will highlight what it really means to be in a swamp!

For more information: <http://tsop2015.ugm.ac.id/geo/>



# SEPTEMBER MEETINGS

## SEG-CODES 2015 Conference



### World-Class Ore Deposits: Discovery to Recovery

#### Call for Papers; Abstract deadline: April 1, 2015

This joint SEG-CODES conference will include key presentations from leaders in research and industry on the discovery of world-class ore deposits, their geology and the recovery of metals from ores, and cover the issues and controversies that affect exploration.

Key sub-themes with new examples:

- Ores in subduction-related arcs: Relations and controls
- Ores in sedimentary environments: Sources, transport, deposition, and hydrology
- Magmatic deposits: Characteristics and mechanisms
- Geometallurgy through the mining chain
- Post-collisional ores: Characteristics, relationships, and genesis
- IOCG and magnetite-apatite deposits: Similarities, differences, controls, and genesis

Short courses and workshops will look at skarn deposits, sediment-hosted gold deposits, footprints of major mineralizing systems, and uranium deposits. Field trips will visit major mining districts in Australia, Indonesia, and New Zealand.

We look forward to welcoming you to this unique part of the world and hope you can extend your visit to enjoy some of the best Tasmania has to offer—our food, wine, museums, and wilderness.

September 27–30, 2015 • Hobart, Tasmania, Australia  
[www.seg2015.org](http://www.seg2015.org)

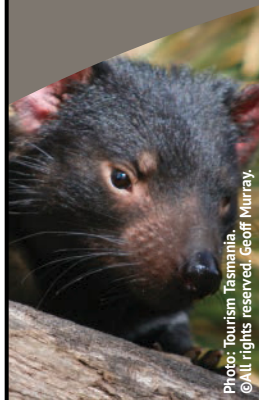


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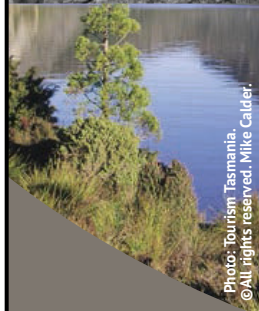
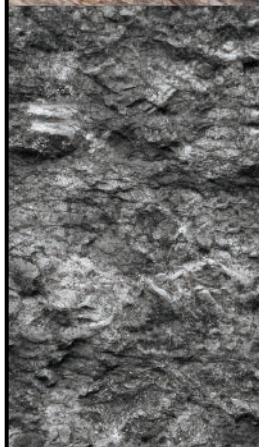


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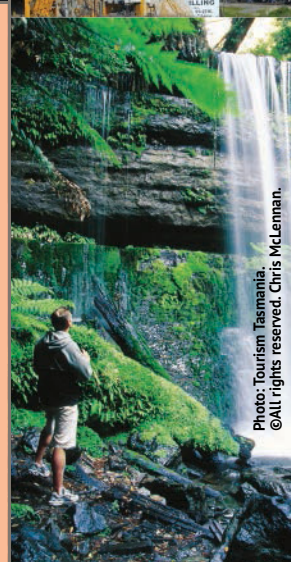
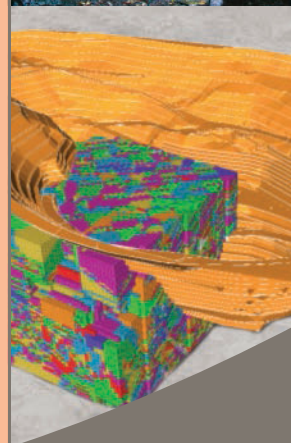


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## 2015 AESE Meeting

**Lawrence, KS USA**

**October 6-9, 2015**

Click those heels, we're going back to Kansas—Lawrence, Kansas—for this year's AESE meeting! Please plan to join us for what's bound to be another great meeting, hosted this year by Rex Buchanan and Julie Tollefson of the Kansas Geological Survey, who hosted the 35th annual meeting back in 2001. We're looking forward to visiting the Great Plains state again and partaking in some of that famous Midwest hospitality.

Lawrence, located in the northeastern part of the state, just 45 minutes west of Kansas City, is a multifaceted, culturally diverse city, offering all the attractions of a big city but with small-town hospitality. Just this year, it was named, by USA Today, as one of the "Ten Best Dynamite Day Trips" near a major urban center. Its downtown is a vibrant shopping, dining and entertainment district, with Massachusetts Street being thought of by many as one of the most beautiful main streets in America. The University of Kansas main campus, located within the city, is also thought to be one of the Nation's most beautiful.

Meeting central will be the charming, historic, recently renovated—and reportedly haunted!—Eldridge Hotel, located on Massachusetts Street, right in the heart of great shopping and restaurants.

The technical program is still in the development stage. Based on a recent survey of the AESE membership, where we asked for input on planning the technical program, we hope to have talks on the following general topics: publishing trends, editing to improve readability, essentials of good graphic design for talks and papers, workshops on using software, keeping on top of important topics (editing resources, professional development, etc.), geoscience outreach, publication ethics, and more.

We welcome any other suggestions you may have for session topics and workshops. If you have specialized knowledge in any of the areas mentioned above or know someone who does, we encourage you to give a talk or workshop, or let us know who we may contact. Please participate. Help us make this meeting a rewarding and memorable one.

The meeting's field trip is almost finalized and will highlight the geological and cultural history of the prairie, with stops near Topeka (the state capital), Tallgrass Prairie National Preserve, and finishing in Cottonwood Falls, the county seat of Chase County, where we'll visit Chase County courthouse and have dinner at the Grand Central Hotel.

We hope you'll join us this October in Lawrence. AESE meetings are a great way to learn about geoscience editing, publishing and communication. Meetings are generally small in size and provide unparalleled opportunities to network with other editors, publishers and educators working in the geosciences. Arrive early, stay longer... see KU Jayhawks play Iowa State or Baylor, visit historic sites or museums, or spend time just shopping in beautiful downtown Lawrence.

If you have any questions, would like more information, or have an idea for a talk, session or workshop, please contact the technical program chair, Marg Rutka at [marg.rutka@ontario.ca](mailto:marg.rutka@ontario.ca). Check back here regularly for program updates, or follow us on [Facebook](#), Twitter ([@AESERocks](#)), [LinkedIn](#), or [Pinterest](#) for updates as they happen.

# OCTOBER MEETINGS

## SVP: 75<sup>th</sup> Annual Meeting

Dallas, TX USA

October 14-17, 2015



The 75<sup>th</sup> anniversary meeting of the Society of Vertebrate Paleontology will be held in Dallas, Texas, USA. The great state of Texas is fortunate to encompass a broad spectrum of geological regions, providing a diverse range of paleontological exploration and discoveries within the state. From the classic Permian redbeds of north-central Texas, to the fossil-rich Late Triassic exposures of the Texas Panhandle, Cretaceous exposures from the Big Bend region of western Texas stretching across the state beyond Dallas and Austin, through the broad expanse of Cenozoic coastal plain deposits in the south and east, and a rich Pleistocene record all across the state, Texas provides a remarkable breadth of paleontological opportunities. Even within a two hour's drive from Dallas one can find Permian, Early Cretaceous, Late Cretaceous, Paleogene, and Pleistocene vertebrate fossil-bearing sites. This remarkable diversity of paleontological

resources also means it is difficult to identify any one, ubiquitous fossil or iconic fossil taxon as representative of the area. The 2015 SVP meeting logo therefore embraces the fossil richness of the entire state of Texas, using the silhouette of the state emblazoned with the colors and styling of the distinctive Lone Star flag of Texas.

Another component of the 2015 SVP meeting logo is the use of the Society's classic emblem, drawn by Margaret Colbert in 1943. Dallas was the home of Jacob Boll (1828-1880), a student of Louis Agassiz who established the Museum of Comparative Zoology at Harvard. Boll first collected Permian vertebrate fossils from Archer County, Texas. Boll gave the fossils he collected to Edward Drinker Cope, who would designate one as the type of *Eryops megacephalus*. Boll would go on to collect in the Permian red beds of Texas for E. D. Cope in the late 1870s, until Boll's death in the field in 1880. The four fossil vertebrae incorporated into the SVP logo are those of *Eryops*. The incorporation of the Society's emblem in the 2015 SVP Annual Meeting logo serves as a reminder of the historical link between Dallas, Texas paleontology, and the 75 year history of the Society of Vertebrate Paleontology.

For more information: <http://vertpaleo.org/Annual-Meeting/Home.aspx>



**SEG**  
INTERNATIONAL EXPOSITION AND 85TH  
ANNUAL MEETING  
NEW ORLEANS

## 18-23 OCTOBER 2015

**SOCIETY OF EXPLORATION GEOPHYSICISTS  
INTERNATIONAL EXPOSITION AND 85TH ANNUAL  
MEETING**

**ERNEST N. MORIAL CONVENTION CENTER  
NEW ORLEANS, LOUISIANA, USA**







Please plan to participate in GSA's 2015 Annual Meeting in the vibrant and historic city of Baltimore, MD. Submit your abstract to hundreds of topical or discipline sessions by 11 August 2015. Choose from more than 30 short courses and field trips to attend in conjunction with the meeting, or just take advantage of fantastic networking opportunities. See you at GSA2015 in November! For more information: <http://community.geosociety.org/gsa2015/home>.

## GSA/SEPM Annual Meeting

**Baltimore, MD USA**  
**November 1-4, 2015**

SEPM worked with the Sedimentary Geology Division of GSA and other related divisions to create a great technical program for the next GSA meeting in Baltimore, Maryland. Please consider submitting an abstract. To submit an abstract, visit the GSA Abstract Submission web page. <http://community.geosociety.org/gsa2015/science-careers/sessions>

### Deadlines

June 2015: Release of Third Circular (Registration information, Field Trip Information, Format of Abstracts)  
June 2015: Registration and Housing Websites Open  
11 August 2015: Abstract Submission Deadline, 11:59 p.m. PDT  
28 September 2015: Early Registration Deadline, 11:59 p.m. MDT (registration fees goes up after this deadline)  
5 October 2015: Registration Cancellation Deadline  
October 2015: Release of 4th Circular

### SEPM-Sponsored Technical Sessions

T72. Ethics of Geoscience in Practice and Application  
T128. Field and Modeling Approaches to Understanding the Response of Coupled Barrier-Backbarrier Systems to Coastal Change  
T142. The Middle Paleozoic World  
T144. 200 Years and Going Strong: The Role of Paleontology in Geologic Mapping (Posters)  
T148. Cenozoic Evolution of Tropical Biota and Environments: A Session Honoring the Contributions of Ann F. Budd  
T151. Foraminiferal Responses and Recovery from Environmental Stressors  
T156. Earth Underfoot: New Frontiers in Ichnology and Zoogeomorphology

- T157. Eat, Prey, Love, and Burrow: Tracing Animal Behavior through Time  
T190. Paleoecological Patterns, Ecological Processes, Modeled Scenarios: Crossing Temporal Scales to Understand an Uncertain Future  
T193. Sedimentary Environment and Process Studies: The Emerging Generation of Scientists (Posters)  
T195. Paleoenvironmental Reconstruction of Hominin Sites: New Methods, New Data, and New Insights  
T196. Revisiting the Atlantic Continental Margin: New Insights on the Geologic Evolution of North American Passive Margin Basins  
T202. Paleosol Case Studies: Resurrecting Ancient Critical Zones through Space and Time  
T205. Integration of Microfossils and Sedimentology in Stratigraphic Analysis  
T212. Deconstructing Rodinia: Neoproterozoic-Cambrian Geologic Evolution of Laurentia's Margins

For more information contact Lucy Edwards, USGS, JPTC Member. [leedward@usgs.gov](mailto:leedward@usgs.gov).

## GSA - Karst Waters Institute (KWI) Sessions

### Baltimore, MD USA November 1-4, 2015

For the GSA Annual Meeting in Baltimore in 2015, KWI is sponsoring 5 sessions:

#### **T116. Contamination in Karst: Beyond the Case Study**

Sarah K. Carmichael, Ellen K. Herman

Karst Waters Institute; GSA Hydrogeology Division; National Cave and Karst Research Institute; GSA Karst Division  
Karst aquifers are an important drinking water source and are particularly vulnerable to contamination. This session will highlight new work on karst contamination modeling and methodologies that take us beyond single case studies.

#### **T119. Geological Interactions within the Global Carbon Cycle**

Chris Groves, Jonathan B. Martin

GSA Karst Division; International Research Center on Karst Under the Auspices of UNESCO; Karst Waters Institute; National Cave and Karst Research Institute; GSA Quaternary Geology and Geomorphology Division; GSA Mineralogy, Geochemistry, Petrology, and Volcanology Division

While over vast timescales interactions between water, the atmosphere, and minerals influence partitioning of Earth's carbon, less attention has been focused on shorter timescales. This session emphasizes links between carbonate minerals and Earth's carbon cycle.

#### **T120. Karst Processes and Speleogenesis: Advances in Monitoring, Modeling, and Measurements**

Benjamin F. Schwartz, Matthew D. Covington

GSA Hydrogeology Division; GSA Karst Division; Karst Waters Institute; National Cave and Karst Research Institute; GSA Quaternary Geology and Geomorphology Division

This session seeks to highlight recent advances in the study of karst systems, with emphasis on process studies, method development, modeling advances, instrumentation innovations, long-term monitoring, and more.

## **T121. New Perspectives in Karst Geomicrobiology and Redox Geochemistry: Advances from 20 Years of Interdisciplinary Research and Exploring Our Future Frontiers**

Annette Summers Engel, John R. Spear, Sarah K. Carmichael, Hazel A. Barton, Philip C. Bennett

GSA Karst Division; GSA Geobiology & Geomicrobiology Division; Karst Waters Institute; National Cave and Karst Research Institute; Geochemical Society

In the 20 years since the Karst Waters Institute–sponsored symposium, “Breakthroughs in Karst Geomicrobiology and Redox Geochemistry,” we welcome contributions that highlight major achievements and latest advances in karst research. Interdisciplinary participation is encouraged.

## **T122. Remote Sensing and Geophysical Imaging in Karst**

Lewis Land, Daniel H. Doctor

GSA Karst Division; GSA Environmental and Engineering Geology Division; GSA Geophysics Division; GSA Hydrogeology Division; National Cave and Karst Research Institute; Karst Waters Institute; GSA Geoinformatics Division  
Geophysics and remote sensing tools are frequently used for investigations of karst phenomena. We welcome papers that address the use of remote sensing and geophysical imaging in karst regions, including both airborne and ground-based methods.

To submit an abstract to any of these sessions: <http://community.geosociety.org/gsa2015/science-careers/sessions>





## PUEBLA MEXICO

# NOVEMBER 11-13, 2015 ICHRCC-2015

*Second International Conference on Hydrometeorological Risks and Climate Change*  
Upcoming AIH Sponsored Conference in Puebla Mexico

The ancient and beautiful town of Cholula, Mexico, one of the magical towns in Mexico, where the Universidad de las Americas, Puebla is located, has been chosen as the site for the celebration of the International Conference on Hydrometeorological Risks and Climate Change.

The city of Puebla, is about less than 3 miles (5 km) away from Cholula, and it is the 4th largest city in Mexico. The international airport of Puebla is served by connecting flights with Houston and Dallas. Mexico City, Mexico's capitol city, is just 2 hours away by bus. Mexico City's airport has many international connecting flights to North America, Central America, South America, Europe, Asia, Africa and Oceania.

## Topics Covered

### A. Hydrometeorological Risks

- a1. Droughts
- a2. Floods
- a3. Groundwater
- a4. Surface Water
- a5. Risk Assessment and Communication

### B. Environmental Issues

- b1. Water and Wastewater Treatment
- b2. Pesticides
- b3. Remediation
- b4. Hazardous Waste
- b5. Heavy Metals

### C. Climate Change Issues

- c1. Alternate Energy Sources
- c2. Appropriate Technologies
- c3. Adaptation and Mitigation

### D. Health Sciences Issues

- d1. Migration of Tropical Diseases
- d2. Health Issues Related to Hydrometeorological Events
- d3. Epidemiology of Migrated Diseases
- d4. Health Exposure and Risk Assessment

### E. Educational Issues

- e1. Higher Education
- e2. Curriculum Development
- e3. Social Media
- e4. Information Technology

## Venue / Sponsor:

Universidad de las Americas Puebla at Cholula, Puebla, Mexico

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