

Geospectrum

News from the Geoscience Community

**SPECIAL: Accessibility,
Inclusion & Equality in
Geoscience**

**AGI-Schlumberger
Fellow Visits Boston
Research Facility**

**IUGS Update on
GeoParks**

**Crazy Cave Stories from
NSS Members**

In This Issue

Fall 2014

NEWS	10
WORKFORCE	46
EDUCATION	56
SPECIAL INSERT	68
GEOSCIENCE POLICY	75
AWARDS & LEADERSHIP	86
IN MEMORIAM	91
MEETINGS	94

Geospectrum

4220 King Street
Alexandria, VA 22302-1502, USA
Phone: 703-379-2480

www.americangeosciences.org/geospectrum
geospectrum@americangeosciences.org

Publisher

P. Patrick Leahy

Editor

Maureen N. Moses

Contributing Editor

Christopher M. Keane

On the Cover

6 th UNESCO GeoParks Conference	26
Crazy Cave Stories from NSS	40
Special Insert	68
<ul style="list-style-type: none"> The Geoscience Community behind the First Fully-Accessible GSA Field Trip Dr. Yonette Thomas to Assume Key Leadership Roles at the AAG Geological Society signs Declaration on Diversity, Equality and Inclusion Toward a More Healthy Discipline 	
AGI Fellow Gets a Peek at Cutting-Edge Research	75

Cover Photo: Lava pours from an active breakout near the Pāhoā transfer station; 11/9/2014. Image Credit: USGS Hawaiian Volcano Observatory.



AGI Executive Committee

Dr. Eric Riggs, President
Texas A&M University

Scott W. Tinker, President Elect
Jackson School of Geosciences, Bureau of Economic Geology

Richard J. Lambert, Treasurer
Roscoe Postle Associates, Inc

William J. Siok, Secretary
Mahawie Consultants LLC

Dr. Berry H. (Nick) Tew Jr., Past President
Geological Survey of Alabama

Katherine Lee Avary, Member at Large
Consulting Petroleum Geologist

Paul M. Bertsch, Member at Large
CSIRO

Dr. Jacqueline E. Huntoon, Member at Large
Michigan Technological University

Mr. Richard M. Powers, AGI Foundation Chair
Consultant/AMEC-BCI -- retired

P. Patrick Leahy, Executive Director
The American Geosciences Institute
The American Geosciences Institute Foundation

Member Societies & Council Representatives

American Association of Geographers - Dr. Douglas Richardson
American Association of Petroleum Geologists - Ms. Laura C. Zahm
American Association of State Geologists - Mr. Laurence R. Becker
The Palynological Society - Dr. Fredrick J. Rich
Association of Environmental & Engineering Geologists - Ms. Rhonda Weidman
Association of Earth Science Editors - Mr. John R. Keith
American Geophysical Union - Dr. Melanie Okoro
American Institute of Hydrology - Dr. Neven Kresic
American Institute of Professional Geologists - Mr. Robert A. Stewart
American Rock Mechanics Association - Mr. Peter H. Smeallie
National Association of State Boards of Geologists - Ms. Sam Christiano
Association for the Sciences of Limnology and Oceanography - Dr. Adrienne Froelich Sponberg
Association for Women Geoscientists - Ms. Denise M. Cox
Clay Minerals Society - Ms. Debora Berti
Council on Undergraduate Research - Dr. Lee Phillips
Environmental & Engineering Geophysical Society - Ms. Catherine Skokan
Friends of Mineralogy - Dr. Nelson R. Shaffer
Geo-Institute of the American Society of Civil Engineers - Dr. Roman D. Hryciw
Geochemical Society - Dr. Barbara Sherwood Lollar
Geological Association of Canada - Dr. Brian R. Pratt
Geological Society of America - Dr. Suzanne Mahlburg Kay
Geological Society of London - Mr. Edmund Nickless
Geoscience Information Society - Ms. Suzanne T. Larsen
History of Earth Sciences Society - Dr. Warren A. Dym
International Association of Hydrogeologists/U.S. National Chapter - Dr. Leonard F. Konikow
Interational Medical Geology Association - Dr. Robert B. Finkelman
Karst Waters Institute - Mr. Harvey R. DuChene
Mineralogical Society of America - Dr. J. Alexander Speer
National Association of Black Geologists & Geophysicists - Mr. Michael J. Carroll
North American Commission of Stratigraphic Nomenclature - Dr. Norman P. Lasca Jr.
National Association of Geoscience Teachers - Dr. Susan Buhr Sullivan
National Cave and Karst Research Institute - Dr. George Veni
National Earth Science Teachers Association - Dr. Roberta Johnson Killeen
National Speleological Society - Mr. David Decker
Petroleum History Institute - Dr. William R. Brice
Paleontological Research Institute - Ms. Stephanie Meyer
Paleontological Society - Dr. Steven Holland
Paleobotanical Section of the Botanical Society of America - Dr. Robert A. Gastaldo
Society of Economic Geologists - Dr. Brian G. Hoal
Society for Sedimentary Geology - Dr. Howard E. Harper Jr.
Society of Exploration Geophysicists - Dr. Louise Pellerin & Mr. William Barkhouse
Society of Independent Professional Earth Scientists - Mr. Al Taylor
Society for Mining, Metallurgy, and Exploration, Inc. - Dr. L. Harvey Thorleifson
Society of Mineral Museum Professionals - Ms. Penny Williamson
Seismological Society of America - Ms. Susan Newman
Soil Science Society of America - Dr. Jan Hopmans
Society of Vertebrate Paleontology - Mr. Ted J. Vlamis
The Society for Organic Petrology - Dr. Prasanta K. Mukhopadhyay
United States Permafrost Association - Dr. Julie Brigham-Grette

International Associates

Canadian Federation of Earth Sciences
Geological Society of Africa
The Young Earth Scientists Network (YES Network)



AGIF **american geosciences institute foundation**

The AGI Foundation's programs impact young people, educators, researchers, the public and policymakers, all who comprise the geoscientists and informed citizens of tomorrow. AGI Foundation's most recognized programs focus on geoscience STEM educational excellence and workforce development, and public awareness and government affairs. Widely acclaimed examples include the most prestigious endowed Fisher Congressional Fellowship, development of inquiry-based geoscience curricula for elementary and secondary school, conducting teacher academies to improve instruction of the geosciences, collection and analysis of geoscience workforce status and trends, and award winning publications and training materials to increase awareness and geoscience literacy by students, the public and professionals.

A major new initiative that the AGI Foundation is working to fund is the implementation of the new AGI Center for Geoscience Education and Public Understanding. The Center builds upon the foundation of the AGI and capitalizes on its strength as a federation of 49 scientific and professional geoscience societies representing a quarter of a million practicing geoscientists in the United States.

Critical new initiatives of the center require new funding from the AGI Foundation, include the following focus areas:

- Understanding the Status of U.S. Earth Science Education with the 2013 "roll-out" of the Nation's new science standards in which 26 States have signed on and 40 states are expected to fully adopt;
- Supporting innovative Energy Education;
- Conducting and distributing outcomes from Geoscience Critical Issue Forums;
- Expanding the scope and distribution of geoscience career materials and workforce information;
- More outreach to students positioned earlier in the "geoscience education flow".

AGI Foundation Leadership

Chair: Richard M. Powers, AGI Foundation

Vice Chair: Stephen M. Cassiani, ExxonMobil (Ret.)

Secretary: William L. Fisher, Univ. of Texas, Austin

Treasurer: William A. Van Wie, Devon Energy Corp. (Ret.)

Interim Executive Director: P. Patrick Leahy, AGI

Associate Executive Director: Jan F. van Sant, Pennzoil Co. (Ret.)

AGI Foundation

P. Patrick Leahy

Interim AGIF Executive Director

c/o American Geosciences Institute

4220 King Street, Alexandria, VA 22302

agif@agifoundation.org

www.agifoundation.org

Tel: (703) 379-2480

AGI Foundation Trustees: John A. Adamick, TGS-NOPEC Geophysical Company

• John J. Amoruso, Amoruso Petroleum Co. • Bruce S. Appelbaum, Mosaic Resources

• Michael J. Baranovic, Shell (Ret.) • Steven R. Bell, CASA Exploration

• C. Scott Cameron, Shell Energy Resources Co. (Ret.) • Peter D. Carragher, BP America (Ret.)

• Kenneth W. Ciriacks, Amoco (Ret.) • William E. Crain, Consultant

• Daniel D. Domeracki, Schlumberger • Michael C. Forrest, Exploration Consultant

• James M. Funk, Equitable Production Co. (Ret.) • William E. Gipson, Gas Investments/Gas Fund Inc.

• Priscilla C. Grew, Univ. of Nebraska State Museum • Elwyn C. Griffiths, ExxonMobil (Ret.)

• Charles G. Groat, The Water Institute of the Gulf • James W. Handschy, ConocoPhillips • Frank W. Harrison Jr.,

Optimistic Oil Co. • G. Warfield Hobbs IV, Ammonite Resources • Paul R. Koeller, Halliburton

• Richard E. Miguez, Bechtel (Ret.) • Kate C. Miller, Texas A&M Univ.

• Donald L. Paul, USC Energy Institute • Thomas E. Scoulios, Schlumberger • John N. Seitz, GulfSlope Energy, Inc.

• Mark W. Shuster, Shell Energy Resources Company • Daniel L. Smith, Sandalwood Energy L.L.C.

• Donald L. Sparks, Univ. of Delaware • M. Ray Thomasson, Thomasson Partner Associates • Jack C. Threet, Shell Oil Co. (Ret.)

• Scott W. Tinker, Texas Bureau of Economic Geology • Nick Way, ExxonMobil Exploration Co.

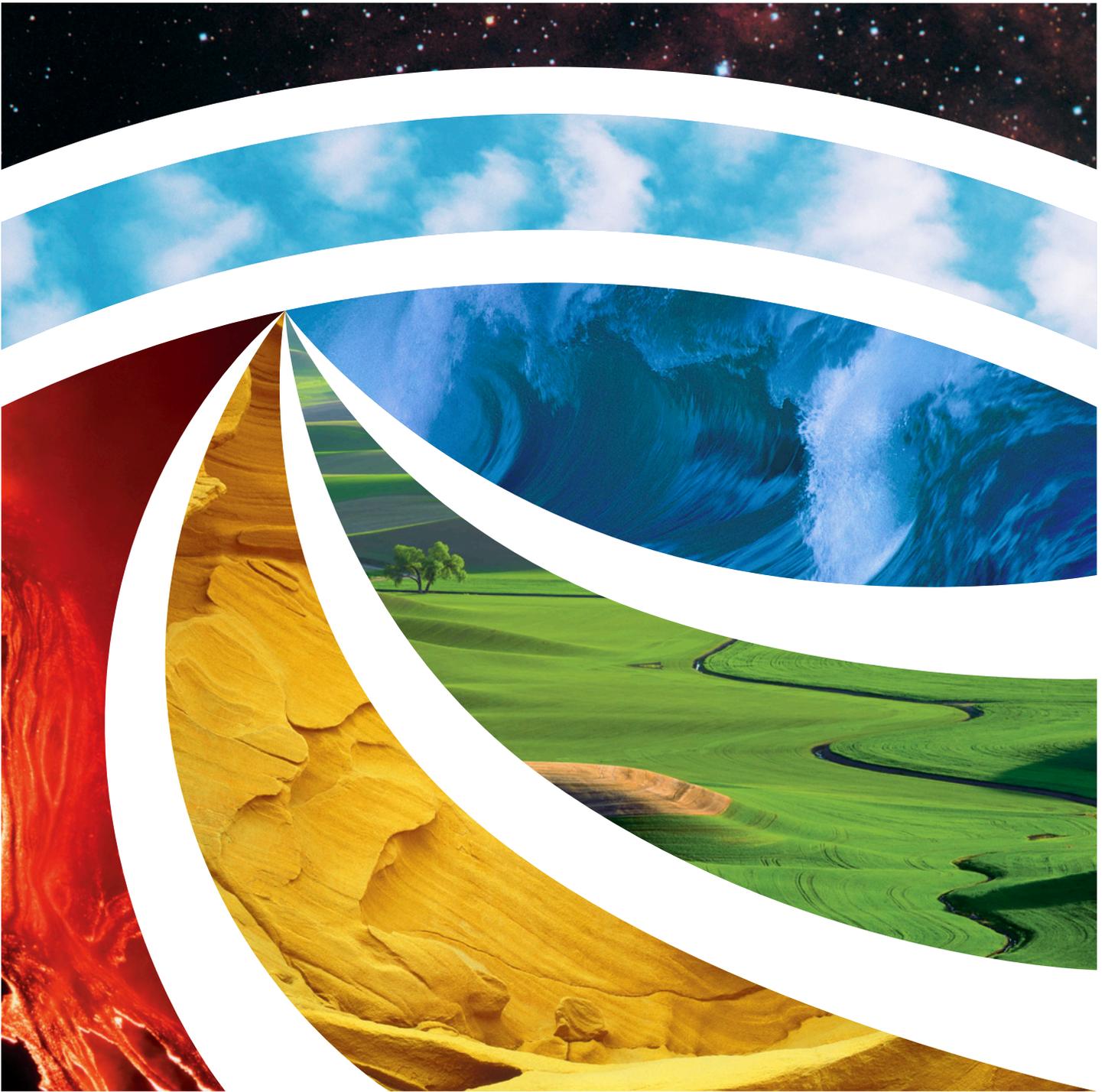
• Paul Weimer, Univ. of Colorado • Kane C. Weiner, Texas Crude, Inc.

• Lawrence P. Wilding, Texas A&M Univ. • John Willott, ExxonMobil (Ret.)

• David F. Work, BP Amoco (Ret.)

The American Geosciences Institute
thanks these sponsors of the
GeoSpectrum e-Magazine:

- **Thermo Scientific**
- **Enviro-Tech Services**
- **WH Freeman & Co.**
- **Elements Magazine**
- **Elsevier**
- **The American Museum of
Natural History**

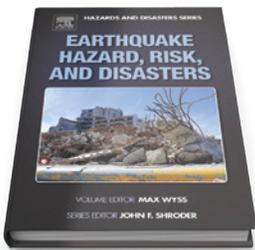


All images and text included in this newsletter are considered the property of the contributing organizations and are printed here with their permission. Please contact these organizations before reproducing any material seen within. AGI and its member organizations appreciate your interest in the geosciences and GeoSpectrum.

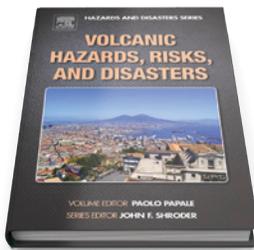
Hazards and Disasters Series

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

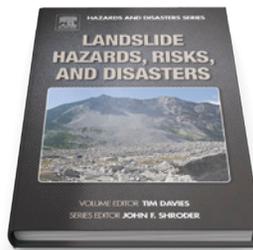
The worst natural disasters in world history are happening right now. The frequency of occurrences has skyrocketed from an annual average of approximately 30 in the 1950's to more than 850 in 2009. Further, the intensity and severity of individual occurrences has also increased. Without rigorous continued focus and research on causality, prediction, preparedness, and prevention, these events will continue to have devastating impacts on human life, ecosystems, and global economies. Elsevier's *Hazards and Disasters* series equips researchers and professionals with the knowledge and understanding of the latest scientific discoveries in natural disasters.



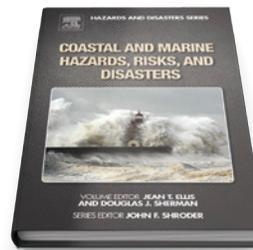
Earthquake Hazard, Risk, and Disasters
9780123948489



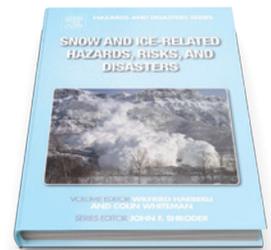
Volcanic Hazards, Risks and Disasters
9780123964533



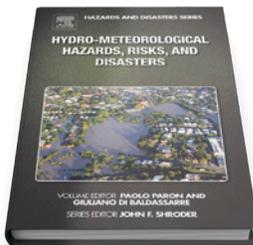
Landslide Hazards, Risks, and Disasters
9780123964526



Coastal and Marine Hazards, Risks, and Disasters
9780123964830



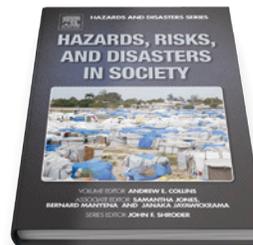
Snow and Ice-Related Hazards, Risks, and Disasters
9780123948496



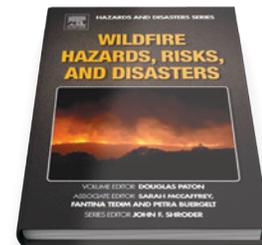
Hydro-Meteorological Hazards, Risks, and Disasters
9780123948465



Biological and Environmental Hazards, Risks, and Disasters
9780123948472



Hazards, Risks and Disasters in Society
9780123964519



Wildfire Hazards, Risks, and Disasters
9780124104341

Buy a combination of 3, 4, or 5 books - 30% off!

Buy a combination of 6, 7, or 8 books - 40% off!

Buy all 9 books - 50% off!!!

Offer ends 28th February 2015

How it works:

1. Visit store.elsevier.com
2. Order, or preorder, the combination of the books
3. Enter the discount code **HAZARDS** at checkout



**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!!!

Go to

www.americangeosciences.org/be-a-part
for a free pin, and **join the community.**

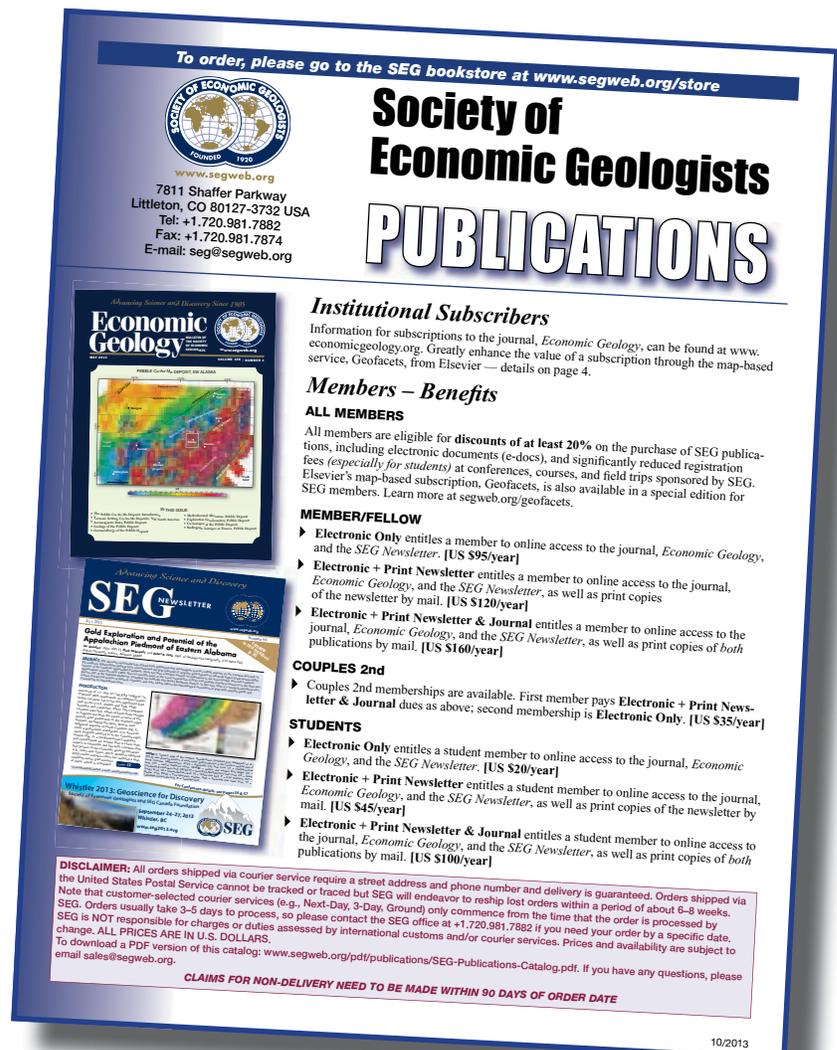


Find what you're looking for with ease!

The SEG Publications catalogue is now available online. With an updated list of publications, locating the material you need is simpler than ever.

Click on the link to start browsing:

segweb.org/pdf/publications/SEG-Publications-Catalog.pdf



To order, please go to the SEG bookstore at www.segweb.org/store

Society of Economic Geologists
PUBLICATIONS

www.segweb.org
7811 Shaffer Parkway
Littleton, CO 80127-3732 USA
Tel: +1.720.981.7882
Fax: +1.720.981.7874
E-mail: seg@segweb.org

Economic Geology
Mining Science and Technology Series 194
PUBLISHED QUARTERLY BY ELSEVIER

SEG NEWSLETTER
Abstracts, Notices and Documents
Gold Exploration and Potential of the Appalachian Piedmont of Eastern Alabama
Whisper 2013: Groundwater by Discovery
SEG

Institutional Subscribers
Information for subscriptions to the journal, *Economic Geology*, can be found at www.economicgeology.org. Greatly enhance the value of a subscription through the map-based service, *Geofacts*, from Elsevier — details on page 4.

Members – Benefits

ALL MEMBERS
All members are eligible for discounts of at least 20% on the purchase of SEG publications, including electronic documents (e-docs), and significantly reduced registration fees (especially for students) at conferences, courses, and field trips sponsored by SEG. Elsevier's map-based subscription, *Geofacts*, is also available in a special edition for SEG members. Learn more at segweb.org/geofacts.

MEMBER/FELLOW

- ▶ **Electronic Only** entitles a member to online access to the journal, *Economic Geology*, and the *SEG Newsletter*. [US \$95/year]
- ▶ **Electronic + Print Newsletter** entitles a member to online access to the journal, *Economic Geology*, and the *SEG Newsletter*, as well as print copies of the newsletter by mail. [US \$120/year]
- ▶ **Electronic + Print Newsletter & Journal** entitles a member to online access to the journal, *Economic Geology*, and the *SEG Newsletter*, as well as print copies of both publications by mail. [US \$160/year]

COUPLES 2nd

- ▶ Couples 2nd memberships are available. First member pays **Electronic + Print Newsletter & Journal** dues as above; second membership is **Electronic Only**. [US \$35/year]

STUDENTS

- ▶ **Electronic Only** entitles a student member to online access to the journal, *Economic Geology*, and the *SEG Newsletter*. [US \$20/year]
- ▶ **Electronic + Print Newsletter** entitles a student member to online access to the journal, *Economic Geology*, and the *SEG Newsletter*, as well as print copies of the newsletter by mail. [US \$45/year]
- ▶ **Electronic + Print Newsletter & Journal** entitles a student member to online access to the journal, *Economic Geology*, and the *SEG Newsletter*, as well as print copies of both publications by mail. [US \$100/year]

DISCLAIMER: All orders shipped via courier service require a street address and phone number and delivery is guaranteed. Orders shipped via the United States Postal Service cannot be tracked or traced but SEG will endeavor to reship lost orders within a period of about 6-8 weeks. Note that customer-selected courier services (e.g., Next-Day, 3-Day, Ground) only commence from the time that the order is processed by SEG. Orders usually take 3-5 days to process, so please contact the SEG office at +1.720.981.7882 if you need your order by a specific date. SEG is NOT responsible for charges or duties assessed by international customs and/or courier services. Prices and availability are subject to change. ALL PRICES ARE IN U.S. DOLLARS. To download a PDF version of this catalog: www.segweb.org/pdf/publications/SEG-Publications-Catalog.pdf. If you have any questions, please email sales@segweb.org.

CLAIMS FOR NON-DELIVERY NEED TO BE MADE WITHIN 90 DAYS OF ORDER DATE

10/2013

Canadian Rockies AWG Field Trip – A Summary

Reprinted with permission from
Dr. Debbie Hanneman

Original Post located here: <http://bit.ly/1uNcnBJ>



Our field trip group poses by Columbia Lake, which forms the headwaters for both the Columbia and Kootenay rivers, and lies within the enigmatic Rocky Mountain Trench near Canal Flats, British Columbia. Photo Credit: D. Hanneman

The AWG 2014 Canadian Rockies Field Trip took place from August 28 to September 7, 2014, with a Calgary-area geology pre-trip for early arrivals on August 27. The main part of the field trip commenced with a mid-morning departure on the 28th from Calgary, and we all headed west along Canada Highway 1 to Lake Louise. After spending two days in the Lake Louise area, we drove north to the Columbia Icefields. A few of us continued further north the next day, on a side trip to Jasper. From the Icefields we toured south to Field, British Columbia, over to Revelstoke, and ended our British Columbia time in Fernie. We then drove east, back into Alberta, and spent time at Dinosaur Provincial Park near Brooks and at the Royal Tyrrell Museum of Palaeontology in Drumheller. The trip ended with our group once more back in Calgary, Alberta.

There were 22 people as full-time field-trippers and two more people on the trip during the Icefields to Field, B.C. part of the trip. Two of the full-time trip participants were students and one of the additional, part-time trip participants, was a student. All of the students on the

field trip are from Mount Royal University in Calgary and are students of our field trip leader, Katherine Boggs. Paul Hoffman and Mindy Brugman also helped out for a day or so during the trip. Marcia Knadle and Debra Hanneman did the trip budget and logistics. We had a great field trip guidebook, thanks largely to Katherine Boggs' efforts. The field trip guidebook, "Tectonics, Climate Change, and Evolution: Southern Canadian Cordillera" will be on sale at the AWG online store soon.



Katherine Boggs talks to the field trip crew about area geology at a stop along the Icefields Parkway in Alberta. Photo Credit: D. Hanneman



Some of the field trip group took the arduous hike up to the famous Walcott Quarry that is developed within the Cambrian Burgess Shale near Field, British Columbia. Photo Credit: D. Hanneman

AGU: Postcards from the Field - Sharing Science in Action

Guest post shared on the GeoSpectrum Blog

Dr. Olivia Ambrogio, AGU Education and Outreach

Fieldwork is an important, and often fundamental, part of many scientists' careers. It's also a great way to share research with broader audiences. The locations, the travel, the equipment, the joys and tribulations of research conducted all over the world—these are elements of science that everyone can get excited about, especially if you have a good photo.

What better way to do this than to ask scientists to send us a (virtual) "postcard" of where they've been and what they're doing—a postcard we could share on our Tumblr?

We put out a call for submissions, along with guidelines, on our blog *The Plainspoken Scientist* during the 2014 field season, and the submissions started pouring in. We've received "postcards" from Greenland and Nepal, Tenerife and the middle of the Pacific Ocean. These scientists are studying everything from ice cores to lava flows, fossils to water-carbon fluxes.

The diversity of images, locations, and research is breathtaking and is an amazing window into the multifaceted world of Earth and space science. It also provides insight into the wonderful (and sometimes-awful) world of fieldwork, as the photos and stories document scientists relaxing in front of beautiful mountain sunsets and struggling with GPS equipment on a treacherous shoreline in the pouring rain. More importantly, these postcards help meet the goal of AGU's Sharing Science program, by giving AGU the opportunity to support members in communicating their science, and demonstrates why it matters, with other audiences, and to put their research in context.

AGU will be making a calendar of some of these great entries that we'll distribute at our Fall Meeting, in San Francisco, CA, but we also look forward to continuing to collect and share these photos and stories on our Tumblr to illustrate the challenges, triumphs, and diversity of science in the field.

Check out AGU's tumblr, and more postcards here:

<http://americangeophysicalunion.tumblr.com/SMEjoins>



The end of a long day in the field was rewarded with a pretty good Aurora for this time of the year! Volcanology Liverpool & LMU Munich Volcanology.
Photo Credit: AGU Education & Outreach



The Khumbu region near Mt. Everest is one of the most spectacular landscapes on earth. Students at the University of Montana Western will be going there in spring, 2015 to work on gathering oral proxy data on climate change from village elders. They can do so because of Montana Western's unique educational approach called Experience One. Students take a single class for a month, and work on projects and other authentic practices in the discipline. I have been going there since 2011, working with students and Sherpa instructors at the Khumbu Climbing Center, teaching them about mountain environments and geological hazards. Photographer: Rob Thomas, Environmental Sciences Department, University of Montana Western. Photo Credit: AGU Education & Outreach

U.S. Department of the Interior advisory group Mining industry professionals worldwide will share their expertise

Reprinted with Permission from SME
John Hayden, Deputy Executive Director
Public Affairs and Government Relations

The Society for Mining, Metallurgy & Exploration Inc. (SME) is pleased to announce that it has been invited to join the U.S. Department of the Interior's Strategic Sciences Group (SSG). The SSG provides science-based assessments and interdisciplinary scenarios of environmental crises affecting Department of Interior resources. Teams of trained scientists will conduct assessments during environmental crises and provide the results of their work to the Secretary of the Interior and departmental leadership to support decision making during crises.

"As the largest professional society in the mining industry, SME is pleased to provide access to industry experts and scientists with the skill sets required by the SSG in any specific crisis situation," said SME Executive Director David L. Kanagy. "SME will be playing an integral role in identifying experts to participate in events for which the SSG is deployed. Our members will provide rapid response counsel that the deployment team needs to make informed decisions."

Established within the Office of the Secretary of the Interior, Secretarial Order 3188 created the SSG, which works across the environmental, economic and social consequences of disaster events and, therefore, requires access to a broad set of knowledge using teams of experts pertinent to the crisis at hand. As a collaborating society, SME joins other members of the Group including scientists from government, academic institutions, nongovernmental organizations and the private sector to lend expertise and assistance to federal, state and local agencies as necessary. During non-crisis times, the Group will develop science-based assessments, scenarios and methods, and make preparations for activating crisis science teams.

Unearthing Secrets: Geoscientists Without Borders

Reprinted with Permission from SEG
Dean Clark, Consultant



Rhonda Jacobs of Geoscientists Without Borders. Photo Credit: SEG

The ability of modern geophysical techniques to noninvasively probe a sensitive area, and one apparently of major historical importance, has been dramatically demonstrated by a Geoscientists Without Borders (GWB) project in Greece. The project, as part of a larger ongoing effort, provided crucial time- and labor-saving information leading to the selection of the most promising area to excavate.

The technique in this case is ground-penetrating radar (GPR), and the site is Amphipolis in northern Greece (600 km north of Athens), where a burial mound has been discovered — a burial mound that might be the tomb of Roxanne, second wife and widow of Alexander the Great. Katerina Peristeri, one of the lead archaeologists on this project, said the find "certainly" dated from the time of Alexander (approximately 300 BCE). Peristeri said the area has been connected to key historic events involving some of Alexander's generals. The GWB project activity is under the overall direction of Euroscience Greece. Michael Arvanitis is the principal investigator.

"We sit in awe of what is possible. Whether it is knowledge of a past age lost, water for today, or early warnings for tomorrow, Geoscientists Without Borders uses geoscience to reveal treasures from below the surface." Rhonda Jacobs, GWB

The find has generated so much interest that Greek Prime Minister Antonis Samaras visited the area in August and issued a statement in which he called it "extremely important." His visit resulted in articles by several news organizations, including one by the British

Broadcasting Corporation (BBC), which was carried internationally.

The burial mound is 497m in length and constructed of marble imported from the island of Thassos. It has been suggested that the tomb was designed by and built under the guidance of Dinocrates, a prominent architect of the time and an adviser to Alexander.

Intensive archaeological investigation of this area began in 1956 and many finds (including more than 400 grave sites) were found in the next 20 years. The current project, under way since 2011 and now at the end of its second phase, used a variety of geophysical techniques before the GPR survey pinpointed the area where intensive digging has been under way in recent months. That has led to the recent discovery of a road and 13 steps leading to the entrance of the tomb which is guarded by a pair of sphinxes.

Archaeologists are now preparing to enter the tomb, which will initially involve removing a stone wall constructed after the burial to protect the site from grave robbers. When the tomb is finally entered, the investigators expect to find three distinct areas identified by the GPR survey.

Although the possibility exists that this is the tomb of Roxanne, who was killed in the power struggle that followed the death of Alexander, it is not expected to be the tomb of Alexander himself. That has never been found, and its location remains one of the great archaeological mysteries. Read about this and other GWB projects at www.seg.org/gwb.

Permalink: <http://dx.doi.org/10.1190/tle33101126.1>

Read More: <http://library.seg.org/doi/full/10.1190/tle33101126.1>

AEG Members Evaluate Oso Landslide



AEG Past President Jeff Keaton (SC) and member John deLaChapelle (WA) were among the seven professional geologists and engineers assembled by the National Science Foundation-sponsored Geotechnical Extreme Event Reconnaissance (GEER) Association to evaluate the deadliest landslide in U.S. history—the March 22, 2014, Oso Landslide. Their report can be downloaded at no cost from www.geerassociation.org. A feature article is being prepared for the December issue of AEG News. Photo Credit: AEG. Original post located: www.aegweb.org.

Kentucky Landslide Inventory: From Design to Application

Reprinted with Permission from AASG
Lee Allison



Landslide damage along the now abandoned Ky. 10, Lewis County, Kentucky. Image Credit: Kentucky Geological Survey

The Kentucky Geological Survey is [compiling a landslide inventory database](#) to better document the distribution and geologic context of Kentucky's landslides. The database provides users with easy access to landslide information, raises awareness of landslide causes, and will help prevent property damage or injury. The database was used to create an online landslide information map, which provides online access to landslide data and gives users the ability to customize the map using other data layers pertinent to landslides.

The database design is based on common attributes collected by other states with active inventories and landslide hazard programs, as well as attributes necessary to document landslides in Kentucky and help with future research goals. A comprehensive landslide inventory database serves as a foundation for understanding landslide distribution, assisting land-use planning decisions, creating hazard maps, and modeling landslide susceptibility. Original Post located here: <http://stat-geologists.blogspot.com/2014/09/kentucky-landslide-inventory-from.html>

48th U.S. RockMechanics/ Geomechanics Symposium at the University of Minnesota

Reprinted with permission from ARMA
Joe Labuz, Chair, 48th Symposium
University of Minnesota



Photo Credit: ARMA

The University of Minnesota, Minneapolis campus was the location of the 48th U.S. Rock Mechanics / Geomechanics Symposium, from 1-4 June, 2014. The sponsor of the meeting, the American Rock Mechanics Association (ARMA), supported the return of the symposium to a university setting, where years ago, it was typical for the meeting to be held on a campus. For example, the University of Minnesota was home to the 5th in 1961, 8th in 1966, 16th in 1975, and 29th in 1988.

The theme of the symposium was Rock Mechanics across Length and Time Scales, to focus on the role of scaling in a variety of natural and engineered processes. Scaling topics ranged from the very fast, such as acoustic emission, to the very slow, such as salt creep, and from the very small, such as microcracking in rock fracture, to the very large, such as a reservoir for CO₂ sequestration. The symposium drew 492 registrants, with 40% of the attendees being international from 32 countries. The format of the meeting involved 48 concurrent sessions and two poster sessions, with 224 oral presentations and 38 posters, for a total of 262 papers; each paper received two independent reviews.

The symposium opened on 1 June with the MTS Lecture delivered by R. Zimmerman, featuring a retrospection on



Above: Charles Fairhurst and his former advisees. From left to right: Wolfgang Wawersik, Jaak Daeman, Bezalel Haimson, Francois Cornet, John Hudson, Emmanuel Detournay, Charles Fairhurst, Michael Hardy, Jean Claude Roegiers, Steven Crouch. Photo Credit: ARMA

rock mechanics. Two keynote lectures, one in mid-morning and one in the afternoon, were presented on each of the three days: on 2 June, energy technologies were reviewed by E. Eide and R. Jung; on 3 June, induced seismicity at various scales was considered by S. Shapiro and S. Maxwell; on 4 June, hydraulic fracturing was examined by N. Warpinski in the context of unconventional reservoirs and R. Jeffrey in mining and petroleum industries. The Theater in Coffman Memorial Union provided the ideal venue for presentation and discussion.

Technical tours included a visit to the Soudan Mine in northern Minnesota led by L. Petersen, a tour of Taylors Falls on the St. Croix River led by G. Brick, and Cold Spring Granite Quarry & Manufacturing led by A. Sourdif. One short course, Multiphysical Geomechanics, taught by L. Laloui and A. Ferrari, and three workshops preceded the symposium; all drew significant numbers. The workshop on Petroleum Geomechanics Testing was organized by T. Addis. R. Ewy and the Role of Geomechanics in Geothermal Reservoirs was organized by Itasca Consulting.

How to Give an Effective and Engaging Presentation was delivered by the Future Leaders.

The technical sessions were noteworthy in both depth and breadth. The timely topic area of hydraulic fracturing headed the symposium with 33 papers, followed by salt mechanics with 23, and wellbore mechanics with 19; traditional areas were solid contributors, as underground mining had 16 papers, fracture mechanics had 15, rock physics had 13, and novel testing had 12. The title of the manuscript selected for the best paper award, "Scaling of Fatigue Crack Kinetics of Sandstone," exemplified the theme. Several other contributions were identified by the scientific committee as award caliber, including: On the Water Retention Behaviour of Shales; Numerical Simulations of Convection Cells in Sedimentary Basins with Application to Geothermal Energy; Robustness of Interference Fractures that Promote Simultaneous Growth of Multiple Hydraulic Fractures; Experimental Determination of Thermophysical Properties of Reconsolidated Crushed Salt; Investigation of Rock Bolts in

Karst; and In-situ Stress Measurements at Earthquake Prone Areas in South African Gold Mines -- to name a few. These and other papers will be invited to submit an expanded manuscript for review and possible publication in a special issue of Rock Mechanics and Rock Engineering.

Social events were a major part of the symposium, with strong support from industrial sponsors: the Welcome Reception on 1 June (Schlumberger-Doll Research); the Great American Barbeque on 2 June (MTS Systems); the Symposium Social & Banquet on 3 June (Itasca Consulting & Agapito Associates); and the closing event on 4 June, a tribute to S. Crouch, P. Cundall, and C. Fairhurst (Itasca, MTS, Shell, TerraTek, Schlumberger). Other highlights were lunches served in the Great Hall of Coffman Memorial Union on the three days of the technical sessions and the breaks at the Great Hall and Tate Laboratory (Golder, MetaRock, Rocscience). Chevron sponsored student registrations and ConocoPhillips hosted poster presentations.

The symposium served also as an informal reunion of former University of Minnesota graduate students in rock mechanics, all advisees of Professor Charles Fairhurst.

The local organizing committee worked tirelessly to develop a scientific program worthy of the symposium name. J. Labuz and E. Detournay were co-chairs, and along with W. Pettitt, L. Petersen, and R. Sterling, were co-editors. Other committee members were W. Dershowitz, C.E. Fairhurst, L. Lorig, S. Mogilevskaya, and G. Pence. The Scientific Advisory Committee provided significant review support, and the Technical Chairs worked to make the sessions illuminating. The symposium is a considerable effort, and the commitment and dedication from P. Smeallie, Executive Director of ARMA, is recognized.

Things You Might Know About ARMA (or would like to know)....

Based on a presentation by Antonio Bobet, President of American Rock Mechanics Association (ARMA) at the US Rock Mechanics/Geomechanics Symposium, Minneapolis, 3 June, 2014

Q: What is the mission and purpose of ARMA?

A: ARMA was founded in 1995 to serve as the organization in which members may conduct research, perform

academic functions, provide services, and lead in discussion on matters relating to rock mechanics, geoen지니어ing, and related disciplines. It is the nature of rock mechanics to be inter-disciplinary. The membership reflects that diversity and desire for connections among fields of knowledge.

Q: How does ARMA function?

A: ARMA is led by an elected Board of Directors, with active participation by an Executive Committee. The Board meets three times each year, to discuss policy matters and provide direction to the organization. One major undertaking is the planning for and hosting the Annual ARMA Symposium. The Executive Director of ARMA, Peter Smeallie, provides support and organization to the Board.

The organization has a related entity, the ARMA Foundation, created as a sister organization. It is a tax-exempt entity that promotes rock mechanics and rock engineering through education activities, dissemination of rock mechanics knowledge, and engagement activities (such as ARMA Sustaining Members and other fundraising activities).

Q: How has membership grown? How many members?

A: The graph tells the story, with about 300 members a decade ago and growing to almost 1000 members now. It is interesting to note that at the most recent Symposium over 40 countries were represented. ARMA is closely associated with ISRM, and many members may join both organizations. There has always been collaboration between the two, and more recently, active joint undertakings and sponsorship.

Q: In addition to the Symposium, what are some of the activities of ARMA?

A: There are a number of things. First, ARMA recognizes significant accomplishments, either in rock mechanics/geomechanics or through service to the organization, to the discipline, and its professional development. That recognition is provided through the work of an Awards Committee (chaired by S. Brandon). The ARMA Awards are:

- Rock Mechanics Research Award

- Applied Rock Mechanics Research Award
- Case History Award
- Dr. N.G. W. Cook Ph.D. Thesis Award
- M.S Thesis in Rock Mechanics Award
- Outstanding Contributions to Rock Mechanics Award

Q: What else is there?

A: Second, the Publications Committee (chaired by B. Haimson) provides timely technical articles and news-worthy items about the association and its members through its e-Newsletter. It recently produced its first special issue on “Geomechanics of Hydraulic Fracturing in Shale Formation,” with a number of articles focused on the same topic.

And third, through the OnePetro website, (hosted by the Society of Petroleum Engineers, <http://www.onepetro.org>) most papers from the Symposia are posted in a digital library; these papers date back as far as 1957. The database of articles is searchable, and made available to the members at a modest service charge.

We should add a fourth source of information, the ARMA website (<http://www.armorocks.org>). Current news of events, association activities, and full editions of articles and papers – including past issues of the e-Newsletter -- can be accessed through the site.

Q: What is the “Future Leaders” group about?

A: It occurred to the Board of Directors that while many of the founders of the organization were active and fully engaged in ARMA activities, there was concern that the organization needed to ensure its continued relevance and to have access to the most recent research, development, and innovation. This led to the formation of the ARMA Future Leaders Program, established for motivated younger members of ARMA with outstanding promise to discuss issues and ideas for the development of ARMA. Some of the activities of those selected to serve in the group are:

- Organizing a workshop on professional skills (namely “How to give an Effective and Engaging Presentation.”)
- Career Corner (an information exchange between job seekers and potential employers)

- Student Trivia Contest, where teams of members compete in a fun contest testing knowledge and experience of rock mechanics
- Aid in organizing professional events, such as the ISRM meeting in Montreal and the ARMA Symposium in San Francisco in 2015.

Q: What are ARMA Fellows?

A: As the discipline has matured and the organization has grown, it became clear that certain distinguished members should be recognized. The honorific of ARMA Fellows was created for this purpose. The existing members elect additional members on a periodic basis; the roster has increased to 20 members since the formation in 2008.

Q: What is new? Anything important?

A: One significant addition to the continued development of the association is the formation of subject matter committees, to allow focus by members on areas of their particular interest. It is envisioned that Symposium topics, newsletter articles, and exchange of professional information will be enhanced through the work of the technical committees. These committees are currently being organized and will be reported on in future e-Newsletter issues. The purpose, structure and leadership of these committees is displayed in Figure 2.

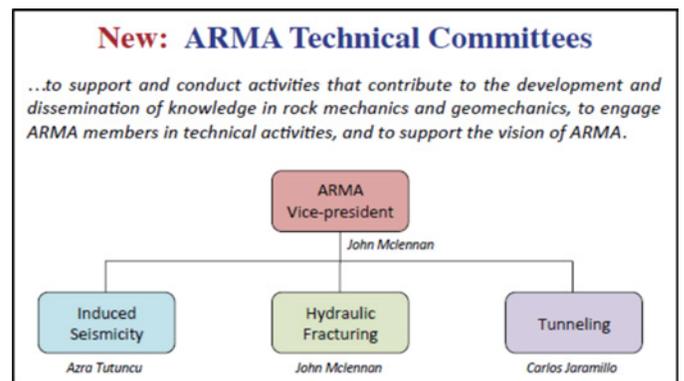


Figure 2. Photo Credit: ARMA

Original post located here: http://armorocks.org/wp-content/uploads/2014/10/2014_fall.pdf

AGI Welcomes Dr. Eric Riggs as Executive Committee President

Maureen Moses, AGI

The American Geosciences Institute welcomes Dr. Eric M. Riggs as its President for the 2014-2015 year. With him, Riggs brings a passion for geoscience, geoscience education and the desire to create an inclusive and diverse geoscience community.

“One of the outcomes of my term as President, I hope, will be a renewed focus on the future of the Geoscience workforce, especially related to diversity and inclusion,” Riggs said. “Given the large projected workforce shortages by AGI and others, we now more than ever need to refocus and redouble our efforts as a community to attract and retain talent from all segments of our society.”

Riggs’ has had a distinguished career in geoscience education. As the President of AGI Member Organization the National Association of Geoscience Teachers (NAGT), Riggs worked with AGI for the first time by participating as a representative to the AGI Member Society Council. His research teams have brought in a combined total of \$10.3 million over his career trying to better understand the cognitive processes of how students learn geoscience concepts, and issues related to recruitment and retention of a diverse population within the geosciences. He has been invited to speak at events hosted by the AGI member organizations Geological Society of America, the American Geophysical Union, NAGT, and multiple universities.

Leadership roles and work within AGI member organizations have helped Riggs gain a robust knowledge of the organizations that make up the AGI federation—valuable information for his presidency. “Many member societies have outstanding programs moving in the direction of reaching out to ethnic and cultural minority communities, attracting and retaining women and broadening participation of individuals with disabilities. The role of AGI can and should be to coordinate the leaders of these programs to make sure that as a community we are doing everything we can; placing resources and effort where it will be most effective.”

Riggs is currently the Assistant Dean at Texas A&M University, as well as a Research Associate Professor at

the Department of Geology and Geophysics. He has previously been affiliated with Purdue University, Indiana University, and San Diego State University.

Notable Papers for October 2014

Reprinted with permission from MSA

Three Highlights and Breakthroughs

Pauling’s Rules

This issue features three Highlights and Breakthroughs articles. On page 1817 of this issue, Bob Downs provides a review of Gibbs et al. (2014) re-analysis of Pauling’s rules, and his use of a saddle point in the electron density between two bonded atoms so as to mark a non-spherical radii. This new view of the “shape” of an atom provides a challenge to our use of certain Pauling’s Rules, where, for example, a spherical atom is assumed so as to determine coordination number from radius ratios. The model presented by Gibbs et al. also provides a new perspective on the meaning of bond strength.

New uses for vermiculite

Then on page 1818 of this issue, Marcos discusses new work by Kaur et al. (2014; page 2018 of this issue), whose studies of gamma-irradiated vermiculite show that this phase has high radiation shielding properties and chemical stability despite radiation bombardment; these properties open the door for the development of new types of opto-electronic devices, and a possible new radiation dosimeter.

Caveats for Ti-in-quartz thermometry

Finally, on page 1820 of this issue, John Hughes reviews work by Ashley et al. (2014; page 2025 of this issue), who use single-crystal XRD and atomistic simulations to test two modes by which Ti may be redistributed in recrystallized quartz. They conclude that strain-driven redistribution may be important, with localized thermodynamic equilibration with the intergranular medium buffering Ti solubility in quartz. Ti-in-quartz thermometry may thus be compromised when quartz is dynamically recrystallized.

Crystallization ages from actinide-rich phases

On page 1985 of this issue, Cottle presents new LA-MC-ICPMS data from thorite and uranothorite $[(\text{Th,U})\text{SiO}_4]$ crystals that range in age from 13 to 500 Ma. These single-crystal age determinations are concordant in the U-Th-Pb system, and so appear to reveal accurate dates of crystallization, with little loss of Pb despite the potential for radiation damage. The method can provide spatial resolution as fine as 5 micrometers, and thus age-dating of actinide-rich minerals should provide a valuable age dating tool that complements single-crystal zircon chronometry.

Negatively buoyant sediments in the deep mantle?

On page 2035 of this issue, Andrault et al. show the results of experiments on Al-bearing SiO_2 at high pressures and temperatures. Their results show that in SiO_2 phases with 4-6 wt% Al_2O_3 there is a ~2-3% density increase for the transition from a CaCl_2 -structured phase, to the a- PbO_2 structure (seifertite) at 113-119 GPa and 300 to 2000 K. Because of the small amount of Si in a subducted MORB, the net effect of this phase transition should be negligible. But since overlying sediments might have considerable SiO_2 , this CaCl_2 -seifertite phase transition may have a significant impact on the negative buoyancy of subducted sediments, and perhaps facilitate the descent of the sedimentary material to the lowermost part of the mantle.

Decompressed glasses are OK

On page 2142 of this issue, Malfait et al. show that measured compressibilities of glasses can be used to accurately calculate in-situ, high pressure-temperature densities and that any structural changes during decompression must be small. Therefore, ambient-pressure spectroscopic measurements on quenched glasses reflect those of the high-pressure structures. This work gives reassurance that various published work on high-P glasses is relevant to melt structure issues of most interest to geologists and geophysicists.

More precise geobarometry

On page 2146 of this issue, Angel et al. re-examine a key issue of geobarometers based on residual stresses that can be observed between an inclusion and a host

phase. In their new approach, they do not assume that elastic properties of the inclusion and host are linear with respect to changes in P and T. Instead, they make use of "isomekes", paths in P and T along which the fractional volume changes of host and inclusion are identical. Their approach is independent of the type of equation of state used for any given system and provides a more detailed physical basis to the barometry problem, which in turn allows for a more accurate determination of entrapment pressures and temperatures from residual stress measurements.

AAPG ICE 2014 Recap

A world-class conference was set in one of the world's great cities this fall as AAPG for the first time held its annual International Conference and Exhibition (ICE) in Istanbul, Turkey.

About 1,400 participants attended and enthusiastically applauded the meeting's technical program, which centered on the theme "The Spirit Between Continents: Energy Geoscience in a Changing World."

The meeting started with a standing-room-only plenary session that addressed "Technical Innovation and Collaboration – Keys to Affordable Energy," moderated by Adif Zulkifli and AAPG Honorary member Pinar Yilmaz.

Other highlights of the technical program included special memorial sessions that honored the work and legacy of acclaimed geoscientists Peter Ziegler (regional tectonics) and Dave Roberts (exploration in frontier areas), plus specific sessions on:

- Complex geology and tectonics of the Tethyan orogenic belt.
- Hydrocarbon potential of the Alpine-Himalayan basins.
- Unconventional potential of Turkey.
- Geology of the Mediterranean, Arabian platform, Arctic and Black Sea.
- Seismic data on key basins across the Black Sea and Turkey that illustrate the importance of the region to the oil and gas industry.

Adding to the excitement surrounding the Istanbul technical program – a theme that attracted a record-breaking 820 abstracts – was the 11th installment of the Discovery Thinking Forum, an initiative of the AAPG

100th Anniversary Committee that recognizes “100 Who Made a Difference” in exploration.

Forum speakers in Istanbul included:

- Vachaspati Kothari, who spoke of the discovery and geology of India’s Barmer Basin.
- Pascale Neff, who spoke of Yemen’s Habban field play.
- Uzma Ghulam, who spoke of the Mabrouk deep gas discovery in Oman.
- Tony Hayward, who attracted a lot of media attention for his talk on exploration in northern Iraq.

The conference got off to an exciting start with an opening session led by ICE general chair Volkan S. Ediger and featuring remarks from AAPG President Randi Martinsen, who said the gathering offered “the latest and best of cutting edge geoscience, technology and business opportunities, all under one impressive roof.”

Martinsen also spoke of AAPG’s continued globalization, citing data and demographics that add up to non-U.S. members now comprising more than 40 percent of AAPG’s total membership.

“But you don’t need to know all of the statistics to support the reality of AAPG’s global outreach – all you need to do is look around this room, and around this conference over the next three days,” Martinsen said. “Look at the diversity that we now represent, both demographically and in terms of our disciplines.

“And that’s a big reason why I’m proud to be here, as AAPG president, participating in a meeting that is yet one more step in our efforts to continue making our place in the world – and, importantly, to have the world continue to be a growing influence in the story of AAPG,” she said.

“We are embracing change – and that dynamic is, after all, a two-way street. AAPG’s focus is on ‘science’ and people,” she continued. “We know if we find and promote the best science that ‘people’ will come to AAPG. And they, in turn, bring to the Association new knowledge, new perspective, new energy, new results, all of which keep AAPG an indispensable part of geoscientist’s career.”

AAPG’s next ICE will be held Sept. 13-16, in Melbourne, Australia.

Symposium on Physical Geography at the 2015 AAG Annual Meeting

David Coronado, AAG

A special feature of the upcoming 2015 AAG annual meeting is the one-day Symposium on Physical Geography, scheduled for Thursday, April 23. The overall intent of the symposium is to raise the visibility of physical geography research at the AAG annual meeting, and provide additional networking opportunities to facilitate and enhance dialog among physical geographers on emerging developments, challenges, and approaches related to physical geography.

The symposium is also an experiment with alternative formats for physical geography sessions at future AAG annual meetings. Over the years there have been numerous informal conversations among members of the physical geography community regarding potential changes to the oral and poster sessions of the AAG annual meeting. Arguments have often been made for larger poster sessions and fewer oral sessions, under the expectation that these format changes would lead to increased session attendance and hence improved visibility within the discipline of the research efforts of individual physical geographers and enhanced popularity of the AAG annual meeting among physical geographers. Reference is often made to the formats of popular meetings of other geophysical-related scientific organizations, which typically include a small number of themed oral sessions that are selected by an organizing committee from proposals by members, with the majority of the attendees’ research contributions displayed in large poster sessions. Many of these arguments were raised again at the special session, Conversation on the Future of Physical Geography, held at the 2014 AAG annual meeting in Tampa. With these recommendations in mind, AAG past presidents Carol Harden, Richard Marston and Julie Winkler organized the one-day symposium as a modest, but manageable, effort to explore the potential for alternative session formats and implications for other components of the AAG annual meeting.

The Symposium on Physical Geography will feature two morning sessions of invited presentations around

the theme, Environmental Reconstruction—A Nexus of Biogeography, Climatology and Geomorphology. This integrative research theme was selected as it cuts across the many facets of physical geography and encompasses the study of past climates, landscapes and biological systems, along with the reclamation of altered environments. The afternoon will be devoted to an extended poster session in a new mode, with up to 100 posters on display during the entire afternoon. Poster presentations are being solicited on all aspects of physical geography, including environmental reconstruction, and the posters will be grouped by theme and/or specialty group. Presenters will post the times next to their poster when they will be available for discussion with viewers, although they are encouraged to stand by their poster during at least a portion of the period from 4:30-6:30 p.m. The symposium will conclude with a happy hour from 4:30-7:30 p.m.

The symposium will be followed by a second Conversation on the Future of Physical Geography, scheduled for Friday, April 24, 11:45 a.m. At this time, attendees will have an opportunity to reflect on the symposium (both its strengths and weaknesses), consider whether this type of structure warrants further experimentation, and, if so, recommend strategies for selecting themes and symposia organizers for a 2016 Symposium on Physical Geography. The long-term goal is to develop meeting formats that support the careers of physical geographers and enhance physical geography within the AAG.

Physical geographers at all stages of their careers are strongly encouraged to submit an abstract for the Thursday afternoon poster session. The deadline for abstracts is November 5, 2014. Please indicate as a Special Request on the online abstract submission form your interest in being part of the Symposium on Physical Geography poster session, and email a copy of your abstract confirmation to Professor Carol Harden (charden [at] utk [dot] edu). Specialty groups are urged to co-sponsor the poster session, and to also use the poster session for some of their own activities such as student poster awards.

Updates on the Symposium on Physical Geography will be posted on the AAG website and also communicated via the AAG Geogram. Please contact Carol Harden (charden [at] utk [dot] edu), Richard Marston (rmarston

[at] k-state [dot] edu), or Julie Winkler (winkler [at] msu [dot] edu) with questions or suggestions for the Symposium on Physical Geography. We hope to see you in Chicago!

Original post located here: <http://news.aag.org/2014/10/symposium-on-physical-geography-at-the-2015-aag-annual-meeting/>

AASG Resolution on Future Directions of Geologic Mapping

Reprinted with Permission from AASG
Lee Allison, AASG

The Association of American State Geologists passed a resolution at its annual meeting outlining a bold vision for geologic mapping with national goals out to 2030.

RESOLUTION ON AASG COMMITMENT TO THE ROLE OF GEOLOGIC MAPPING IN SOCIETY

WHEREAS geologic mapping is a core activity for geological surveys that underpins geoscience as a whole and that provides the framework and understanding that supports subsurface prediction;

WHEREAS managers of energy, minerals, water, hazards, climate change, environment, waste, and engineering increasingly rely on and therefore need to invest in well-devised applications of geologic mapping;

WHEREAS investments in geological mapping return benefits including lives saved, resources discovered, costs avoided, increased efficiency, and fundamental understanding of earth composition, structure, and history;

WHEREAS geological surveys can accelerate progress in response to societal needs through proven collaboration methods, concurrent with efforts in program administration, infrastructure, formats, and accessibility;

WHEREAS benefits will be enhanced by this nationwide acceleration, including updating, coordination, and seamless compilation of multi-resolution plan view and 3D onshore and offshore geological mapping; and

WHEREAS with adequate funding, the following key objectives could be achieved by 2030: an ongoing vibrant pace of detailed mapping, regular updating,

nationwide multi-resolution seamless coverage, and 3D mapping at least of depth to bedrock and basement as well as subdivision of sediments and/or little-deformed rock strata where data allow;

NOW, THEREFORE BE IT RESOLVED, that members of AASG believe that state geological surveys should increase their commitment to work with USGS and other partners through the National Cooperative Geologic Mapping Program to ensure timely provision of optimal geological mapping that will progressively be more:

- focused on immediate user needs while accommodating unanticipated applications, and being designed with reference to ongoing statewide assessment of the status of databases and mapping;
- focused on the most detailed mapping where needed, while committed to statewide completion at an appropriate scale;
- reconciled with integrated, appropriate topographic and bathymetric data, integrated from onshore to offshore, and coordinated with soil mapping;
- based as needed on compilation ideally of all public domain drillhole and other relevant data, along with strategic drilling and newly acquired geochronology, geochemistry, and geophysics;
- based on sound stratigraphic naming, and categorized using broadly accepted query language;
- committed to regular updating of maps as science and technology progress, and assembled as statewide seamless compilations;
- 3D, in which the extent, thickness, and properties of all little-deformed sediment and rock units, and selected complex structural features such as faults and folds, are distinguished; coordinated with increasingly 3D versions of state, continental, and global-scale maps, while being fully accessible through robust and open-source software for conveying subsurface mapping; and
- linked to a complete compilation of scanned and searchable publications, as well as consistent and comprehensive geological, geophysical, and geochemical databases, thus better fulfilling the essential role that geological surveys play in response to the needs of society.

Original post located here: <http://stategeologists.blogspot.com/2014/06/aasg-resolution-on-future-directions-of.html>

NSS Offers Online Videos of Distinguished Cavers and Caving Webinars

Reprinted with permission from NSS



Photo Credit: NSS

The National Speleological Society is pleased to present video presentations of its long-awaited “Luminary Series” — featuring pioneering cave explorers, karst scientists, and other long-time NSS members. These talks are designed to give young and old cavers alike the opportunity to learn from some of the true superstars in our Society.

This program is the brainchild of AVP Geary Schindel and Dave Hughes; the videos are produced by Dave Socky and Webmaster Alex Sproul. Recommendations for future speakers are encouraged.

Access Luminary Talks here:

<http://caves.org/luminaries/>



Photo Credit: NSS

NSS Hosted Webinars Including titles such as:

- From Giant Crystals to Tiny Microbes: The Mineralogy & Microbiology of Naica by Dr. Penny Boston
- Alpine Karst in Utah An Overview by Dr. Larry Spangler
- Use of Geophysics to Detect Solutional Features in Karst by Ron Green

Sign up online for the next webinar, Nov. 18 2014, “Living With Karst: The Benefits and Challenges of Living in a Cavernous Environment” presented by AGI Member Organization National Cave and Karst Research Institute’s Executive Director Dr. George Veni.

Program Description

Do you live in karst? About 25% of the US and the planet's land surface is karst. Karst areas are the world's most diverse, fascinating, resource-rich, yet problematic terrains. They contain the largest springs and most productive groundwater supplies on Earth. They provide unique subsurface habitat to rare animals, and their caves preserve fragile prehistoric material for millennia. They are also the landscapes most vulnerable to environmental impacts. Their groundwater is the most easily depleted and polluted.

Sinkholes located miles away from rivers can flood homes and businesses. Following storms, droughts, and changes in land use, new sinkholes can form suddenly, collapsing to swallow buildings, roads, and pastures.

Karst hydrogeologist Dr. George Veni, Executive Director of the National Cave and Karst Research Institute, will explain how karst "works," the unique benefits and challenges of living in karst, and what people need to know to live safely in karst areas.

George Veni is best known as the Executive Director of the National Cave and Karst Research Institute (NCKRI). He is also the Vice President of Administration of the International Union of Speleology. George began caving nearly 39 years ago and immediately joined the NSS and is now a Life Member. His caving led to an international career in karst hydrogeology. Before joining NCKRI almost 8 years ago, he ran his own karst environmental consulting company for 20 years.

Please arrive at least 10 minutes early to assure your space to this fantastic webinar.

All webinars are recorded and stored for future use on the NSS website www.caves.org.

IPC4: Charting a Post-Doc Course in Mendoza

Reprinted with Permission From STEPPE (NSF, GSA, PS, SEPM, PBBSA)

Robyn Mieko Dahl

When I returned to my office at UC Riverside after attending the 4th International Paleontological Congress, my advisor asked how it went. Honestly, I told her, it was probably the best conference I've ever attended. It was probably a combination of things — the program was



Mt. Aconcagua. Photo Credit: Robyn Mieko Dahl

pure paleontology and content was solid; the event was international and therefore attended by people who never make it the North American conferences I'd attended; and that it was held in an interesting city in a country I'd never been to before. I had a feeling IPC would be great when I first heard about it, almost a year ago, but Mendoza, Argentina had felt impossibly far away from Riverside, CA. Nevertheless, I submitted an abstract, put in applications for travel grants, and crossed my fingers.

A couple of months later, I found out my abstract was accepted and that I'd received a STEPPE travel grant, so I was on my way to Mendoza!

I presented my poster, "Paleoecology of Ordovician Gastropods from the Great Basin, USA," in the Precambrian and Palaeozoic Biotas and Events session. While I find the early days of gastropods fascinating, the number of people researching Ordovician gastropods is quite small and most of the work focuses on phylogeny.

My research is field-based in order to gather the necessary (but often neglected) environmental and sedimentological context of Ordovician gastropods, in order to quantify their ecological importance during the Great Ordovician Biodiversification Event. My poster got some good foot traffic, and I was able to talk with a number of people about this often forgotten clade.

I'm in my final year of my Ph.D. program at UC Riverside, so in addition to presenting my research and attending as many talks as possible, I made a couple of goals for myself at IPC: chat with the small community



Mural of Charles Darwin at Puente del Inca. Photo Credit: Robyn Mieko Dahl

of Paleozoic gastropod workers and others interested in the Great Ordovician Biodiversification Event; network with anyone and everyone with museum experience (especially on the education side, as that's where I want to end up eventually); and sniff out potential jobs and/or post docs to apply for. I'm happy to report that I achieved all my goals and more, and that IPC was a wonderful environment to engage in a range of interesting and useful conversations, both in terms of research and professional development. I also learned a staggering amount in Steve Holland and Mark Patzkowsky's Stratigraphic Paleobiology short course.

Some of the most unexpected and truly beneficial things I took away from IPC were the casual conversations, held over dinners or coffee breaks, with other early career scientists. I'm in the last stretch my graduate work now and am finally starting to make plans for my post-graduate career, and life can feel very stressful at times. Chatting with post-docs and young faculty about their struggles and successes was both motivating and reassuring and I've returned to my lab with newfound momentum to get through this final year.

Having never traveled to South America before, I wanted to make the most of my trip so I hung around Mendoza on my own for a couple of days after IPC ended. I took a day trip up into the Andes to see Mount Aconcagua, which towers above Mendoza at 22,837 ft. It was incredible to drive from an elevation and climate very similar to my home in Southern California up into the snowy and glaciated Andean peaks, and was possibly the most beautiful place I'd ever been to. This was also

the region of the Andes that Charles Darwin explored in 1843, before he continued up the South American coast and eventually out to the Galapagos Islands.

I've come away from IPC with a great feeling about my place in our community of paleontologists. I love that our science is thriving and I'm grateful that organizations like the STEPPE office can help support young researchers like myself and the other awardees, because this experience would have been impossible for me without the travel grant.

Pipeline Initiative Hits Shipping Milestone

Courtney Chadney, AAPG EXPLORER Correspondent

It started with a desire to share science with schools and libraries that otherwise wouldn't have access to the latest AAPG publications.

A few books shipped here, a few more shipped there ...And then the acorn became a tree.

AAPG's Publication Pipeline Committee recently had a small celebration to mark a very big accomplishment: Just a few weeks ago, the group officially topped the 100-ton mark of books, periodicals and other information that have been shipped around the world.

"With every shipment is a story," said AAPG member Martin Cassidy, founder and cheerleader behind one of AAPG's most successful programs. "We could write a book!"

"Geoscientists helping geoscientists" is how the Publication Pipeline Committee (PPC) describes its efforts, as they collect donations of geoscience books and periodicals – usually from AAPG members – and forward them overseas to universities in need.

The program, now supported by the AAPG Foundation, is in place to "improve geoscience education in developing countries by providing used geoscience books and periodicals at no cost to university libraries and other libraries that request them."

The books themselves come from individuals who donate them to the AAPG Foundation.

Places shipped to so far include: Afghanistan, Argentina, Bangladesh, Colombia, Ghana, India, Indonesia, Liberia, Malaysia, Nigeria, Trinidad and more.



Photo Credit: AAPG

It all started when Cassidy, who has won an AAPG Distinguished Service Award for his efforts with the Publication Pipeline initiative, was asked to look at a donation of 50 boxes of publications from the estate of a well-known Houston geologist.

“The main library did not want them,” Cassidy recalled. “They were offered to graduate students and staff, and with no takers they were to be thrown away.”

After inquiring with other universities, he soon found that wasted publications were a common occurrence. Donations were accepted, a few books sold, but most were just thrown away.

Cassidy described the reality, “Room constraints, duplication, a belief in digital libraries and lack of staff to even sort the donations prevented their preservation.”

A Win-Win Situation

But Cassidy, having traveled and worked as an international geologist, knew of libraries that had few books – especially geoscience material – due to lack of funds or destruction of library holdings from war, terrorism, riot, fire or flood.

And he was determined to not allow these books to go to waste.

Cassidy rented a storage locker to store the residue of that initial Houston donation, thus marking the beginning of a non-profit company of volunteers that Cassidy would set-up in 2000 known as the Publication Pipeline.

“I realized there would be a flood of geoscience publications as our fellow geologists who retired, left employment or died,” Cassidy said.

His Publication Pipeline would serve as a conduit of geoscience publications from the United States to universities in need all over the world.

“We would sort, inventory, pack and arrange shipment,” Cassidy said. “Companies or geoscience organizations in the target countries would arrange import clearance along with the receiving university – shipments would be paid by companies active in the country of the university receiving shipment.”

After reaching out to local interests and previous comrades, Cassidy found an early member in Rick Wall, who had worked with Cassidy previously on overseas projects.

Wall, who was currently working on a project in Nigeria, joined Cassidy and helped persuade his company, ConocoPhillips, to sponsor the very first official Publication Pipeline shipment in 2001 to the Nigerian Association of Petroleum Explorationists.

“Oil companies like to be involved in the area they are working in,” Wall said. “It’s a win-win situation for everyone.”

After the first shipments, Cassidy knew they had a working model and could really grow it into something big – but they would need more support.

The solution: They prepared a request to become an official committee of the AAPG.

“We realized that the effort was going to be a success and really fit in the family of activities of the AAPG of which I had been an active member of for many years,” Cassidy said.

The committee structure proved to be exactly what was needed.

“Our committee increased in members,” Cassidy said, “and our collection of donations soon outgrew our rented storage units.”

Food For Thought

Since becoming official in 2001, the effort has continued to grow – so much, in fact, that it continuously is in need of more space.

Along with reaching its 100-ton milestone, the Publication Pipeline recently reached another successful benchmark as they entered a new community partnership with the Houston Food Bank, which is now graciously providing a large amount of space in its



Photo Credit: AAPG

warehouse for even more geoscience publication storage.

“The Food Bank feeds the body and we (PP) feed the mind,” Cassidy said.

Currently, the Publication Pipeline has about 100 pallets in storage at the Houston Food Bank. Twenty pallets are on their way to Thailand, five are being prepared to go to Colombia, five to Venezuela and two are in preparation to go to a university in China.

Walls finds being a part of the effort extremely satisfying, as he is able to make an immediate impact on someone else’s life.

“Who wouldn’t want the opportunity to give students the tools they need to get an education?” he asked.

Wall believes one of the only downsides to the work is the fact that they rarely get the chance to be present when the universities receive the donations. However, the committee likes to ensure that they always have an AAPG member present from that country to participate in the donation ceremony and document the exchange with photos and reports.

One of Wall’s favorite pictures has been a photo of a shipment from Indonesia that captured students unpacking mountains of books with huge smiles.

“Seeing the enthusiasm in their faces – it makes it all worth it!” he said.

Wall, however, believes there is a new focus for the committee to tackle – in order to send out as many

books as they possibly can, they need new blood to join the effort.

“We have the foundation set for future success,” Wall said, “we just need more people to help us achieve our goal.”

Interested? Any and all AAPG members are encouraged to be part of the program through donations of used books, but also by actually being a part of the committee who makes it all possible.

For more information, go to www.foundation.aapg.org/programs/publicationspipeline.cfm.

Report on 6th UNESCO Geoparks Conference, Stonehammer

Reprinted with Permission from IUGS

IUGS Vice-President Marko Komac attended the Global Geopark Network (GGN) Bureau Meeting, held in concurrence with the 6th International Conference on Global Geoparks at Stonehammer Geopark, New Brunswick (Canada). Based on its decision, the GGN Bureau awarded the 7th International UNESCO Global Geoparks Conference to the English Riviera Global Geopark, UK, and accepted 11 new Geoparks to the GGN family including the first African Geopark (Congratulations!!!).

GGN has now 111 members from 32 countries and five continents. Several important decisions were made by Geopark representatives at their General Assembly: GGN will become a legal non-profit entity; statutes of this future legal entity were agreed upon and adopted; agreement was made that all Global Geoparks must have an Earth Scientist available on a daily basis and the Stonehammer Declaration was adopted.

IUGS sees the Geoparks community as an advocate of sustainable geological heritage management, as the promoter of geoscience, and as a tool for educating the widest possible audience about geological beauty, attractions and their protection.

See UNESCO’s news announcement [here](#).

Water for Haiti

A Former Environmental Consultant Helps Bring Potable Water to Post-Earthquake Haiti

Reprinted with permission from AEG
Rick Kolb, Carolinas Section



Photo Credit: Doug and Susan Rakoczy

Most geologists recall the devastating earthquake that rocked Haiti in January 2010. Haiti was already one of the most impoverished, if not the most impoverished, country in the western hemisphere. While international response and sympathy were strong initially, much of the funding promised soon after the earthquake never arrived. Consequently, the recovery has been extremely slow, and tens of thousands of Haitians still lack the basic human needs: food, water, and shelter. Doug Rakoczy, formerly an environmental scientist with environmental consultant Duncklee & Dunham in Cary, NC, and his wife, Susan, enlisted their family in the effort to provide safe drinking water to Haitians.

This article summarizes the situation and the efforts since 2011 by Doug and Susan, the Carolinas Section and individual Members, and Section Sponsors to help provide safe drinking water for Haitians.

Doug Rakoczy first contacted Dave Duncklee and Tom Dunham in 2011 and asked if they could help secure well supplies to construct water-supply wells. Such supplies are difficult to come by and are expensive in Haiti. Dave and Tom recruited Carolinas Section sponsors Geologic Exploration, a well contractor, and ESC Lab Sciences to help in this effort. Geologic Exploration donated wells supplies and screen, and ESC donated water-testing services. Dave and Tom donated their time and expenses to drive the well supplies to Florida for shipment to

Haiti. The Carolinas Section donated \$500 to support this effort.

2011 – An Overview

This article is atypical for AEG News in that it is both a technical article and a highly personal testimony of the challenges Doug and Susan faced, as documented in their emails first sent prior to the first shipment of well supplies. Thus, the writing style is different from the usual articles in this section of the News. Comments in quotation marks are taken directly from the Rakoczy's emails of February 2011, less minor edits, and with text additions in brackets [] for clarity. As you read these minimally edited emails, take time to think a little bit about the things the western world accepts as a given. Perhaps you have just had a tall glass of cold iced tea, or did the dishes, or treated yourself to a nice hot shower and gotten in some clean clothes after a hard day at work. All of this requires water, clean water; readily available and plentiful here, but not so in many parts of the world.

Former North Carolinians Doug and Susan Rakoczy live with the youngest three of their five children about seven kilometers west-southwest of Cap-Haitien on the northern coast of Haiti. "The distance means nothing in Haiti," says Doug, "because it takes about 30 minutes to



Photo Credit: Doug and Susan Rakoczy



Photo Credit: Doug and Susan Rakoczy

drive that distance because the roads are so bad.” Doug and Susan work with two organizations—Global H2Ope based out of Fargo,

ND; and Lifewater Canada (www.lifewater.ca)—installing water wells and teaching the Haitians to maintain them.

Doug has earned several degrees, including a master of science in geo-environmental studies and an education degree with emphasis on special education. In addition to his more recent teaching position in Minnesota, he has over 12 years of prior experience as an environmental consultant and project manager for Duncklee & Dunham. His experience included soil and groundwater assessment and remediation sites in just about every state between Connecticut and Texas.

Asked why they went to Haiti in the first place, Doug said that it all stemmed from Susan’s background in long-term missionary work. “She first went to Haiti in January 2009 on a short-term mission trip to do nursing/medical clinic work. She was with a group from near where we live in Minnesota, [which] had also been going to Haiti for a number of years on short term mission trips to drill wells and do [hand] well pump repair.” Susan returned to Haiti after the big earthquake as part of a faith-based crisis response team. Another team member from Minnesota, Bryan Odegard, “decided to start an organization called Global H2Ope, so that there could be some sort of a year-round program to help drill and repair well pumps.” Doug says “We decided that we felt guided to be the people working on the ground in Haiti with

Global H2Ope, and they agreed. Because my wife is an RN and I had a background in environmental geology, it seemed like a good fit. Clean water (or lack of it) is such a HUGE health issue here, and leads to the sickness and misery of so many people. I guess we thought we could try and help, and we felt that this was the direction that God was leading us.

“Susan spent a good part of the summer of 2010 [in Haiti], and I came for several weeks in late July/early August. We moved here with our children Jacob (14), Julia (12), and Joshua (9) in November of 2010. We also have two [independent] older children. We feel it’s important to help develop a sustainable system to help Haitians get clean water through a well drilling and pump repair program (and I mean hand pumps, which is what many of the wells drilled here have) that will eventually be run by Haitians. We seek to give them the training and resources to do the work themselves (and not have to rely on Americans or Canadians).”

Doug and Susan’s group partners with Lifewater Canada to drill wells, repair pumps, and provide health education, training, and equipment—with the goal of enabling Haitians to do the work for themselves. This provides not only clean water but also employment opportunities for the Haitians, and, it is a catalyst for a sustainable program with the responsibility for Haitians to continue.

Well Drilling

Doug’s team drilled a well at a nearby orphanage/school in February 2011. The school has 400 students, 108 of them orphans, and is run by Catholic nuns.” Doug is bending over the mud pit shoveling cuttings. The existing well at the school is located adjacent to where their latrines were later built so it has been contaminated. The new well was drilled in the...portion of the property as far upgradient of the latrines as we could get (around 250 or 300 feet). We are drilling with small trailer mounted rotary drills. The other two rigs that are used are smaller than the one in the picture...”

“We don’t have a mud tub. You have to dig your mud pits before you start drilling. The drilling is strictly wash rotary/mud rotary. This well was drilled to a depth of around 90 feet. The driller (Bryan, on left) is from Minnesota and is one of the Global H2Ope founders. We

are trying to train Haitians to run the rig. Edrick (in the blue hat) will be the driller. The Haitian drillers rarely use bentonite gel to mix drilling mud and they have trouble with holes collapsing, especially since they take a long time to get their drill rods out of the hole. They don't use bottom caps on the wells - they flush water inside the casing to get the sand out and get the well down. Then they put a little gravel down inside the casing to the base of the screen to keep sands from running up inside the casing. I've not seen anything like it before. It's like going back in time about 40 years. Most of the wells have hand pumps set in them, and people just come and fill up their containers and carry it back to their homes. I believe 75% of Haitian homes don't have running water.

"All the drilling I have seen here is wash/mud rotary. I've never seen any hollow stem augers. They are too expensive and hard to get. The small drills are also not capable of turning 6 1/4 inch ID augers to the depth necessary. We also don't have bentonite pellets; too hard to get and ship in economically. We use 4-inch PVC casing in 20-foot lengths with bells to connect; again, threaded casing and screen is not available here and is too expensive to ship in. We cut the screen with a hacksaw, but I cut three rows of slots no more than one inch apart. It takes a long time to cut the screens, and the importance of cutting the screens properly is something we are trying to get across."

Doug describes more well drilling: "The drill used for the well installed at the orphanage was a Deep Rock D 20, I think. We actually had an end-cap on this well. The other drill one of the Haitian drillers is using is a smaller Deep Rock D 50. That rig only has 1½-inch drill rods, no stabilizer rod, and only a drag bit (no roller cone bit). That engine on the smaller rig only turns the drill stem; you have to use a hand crank to drill down or pull the drill stem back out. There is a separate generator for running the pump to pump the water.

"The drillers here don't like using mud because of the cost of the bentonite gel and difficulty getting it in here. They do have problems with holes collapsing, however, as you can imagine. It is also difficult getting filter pack here. It's hard to find sand the right size, and you have to do a lot of screening. Often, the sand (or gravel) is too coarse and too angular to serve any purpose, and they have a hard time getting it down to the screen.



Photo Credit: Doug and Susan Rakoczy

However, it is often better if the formation just collapses around the screen, because the coarse sand and fine gravel that we try and screen the wells in makes a great natural sand pack.

"We are also working on helping the Haitian drillers understand the need for a grout seal. Sometimes the hole will collapse and they'll want to put their filter pack around solid casing 20 or 30 feet above the screen. They need to understand they need a longer grout seal, at least 20 or 30 feet."

Geology

"We are in the Northern Plain of Haiti [which is] basically a bowl surrounded by mountains on three sides and the ocean to the north. The drilling is in sediments consisting of clayey sand to silty, fine sand to more coarse sand and eventually sand and gravel. There are some harder layers occasionally (limestone or coral?), and there are also sometimes issues with salt-water intrusion as you get closer to the coast.

"Once you start getting up in the foothills the drilling becomes much more difficult as rock is obviously much shallower. It gets rugged in a hurry once you rise in elevation out of the Northern Plain, and we can't drill in these locations. In the Northern Plain, there are confining layers that are present in places between 70 and 100 feet below grade and I have seen some wells that are flowing at the surface if they are drilled deep enough. The deepest I have seen a well drilled is 140 feet."

Pumps

"Most of the wells we install will have hand pumps installed in them—we are using AFRIDEV pumps (designed in India)." According to an online description, the Afridev pump is a fully corrosion resistant, lever action hand pump, designed for heavy-duty use and for serving communities of up to 300 people. It is a public domain pump defined by Rural Water Supply Network (RWSN) specifications.

Doug continues; "We drill wells for communities, churches, and schools, and there has to be a certain amount of community involvement. Many people will use the community wells—people come with their buckets and other containers to get water from the wells for cooking, drinking, etc.

"As I said before, around 75% of Haitian houses don't have running water. It would also not be practical to put submersible pumps in the wells because there is no consistent and reliable power source available. There are huge infrastructure issues here."

Laboratory

In an email dated February 18, 2011, Susan reports, "One of the projects of this week has been to take a concrete shed behind our house and turn it into a laboratory to house an incubator to grow water samples and check for bacteria. So as part of that process it was determined that we needed some sand to mix the cement for blocks and plastering the walls. It was arranged that on Wednesday morning at 6:00am the sand would arrive. I picked out a place to put it that would be convenient for mixing and anticipated a pickup truck to show up in the morning. That night it once again rained torrentially and was still cloudy as I was up preparing to direct where the sand was to be placed.

"At 6:30 am... I hear this loud noise at the front gate... I look out the window and in comes an enormous dump-truck filled to the brim with sand!!! I was in a bit of shock, but thought, OK ... I guess we can make this work."

"So the truck started backing into the area I had arranged, unfortunately, because it was HUGE, and the ground was spongy, it created about 6–8-inch tracks and demolished our cute little brick walkway!"

"Before he went any farther and hit a tree or the house, I stopped him and told him I'd find another place! So we went to the other part of the lawn, (again leaving deep tire tracks) and he dumped the sand. As he got ready to move out, we noticed that he now had a flat tire in the back and that he was quite stuck in the mud that he had just created. I could not help but find this so typical and amusing. So the driver now had to take the sand, which he had just dumped into a pile, and use our shovel to throw our sand under his wheels to get his enormous 1970ish beat up dump truck out of our yard!"

"When it was all over and he had eventually gotten unstuck... I surveyed the broken walkway, the new trenches in our yard and the deep hole now filled with muddy sand and looked over at our [nine-year-old] son who said, 'That was a really cool dump truck!' and that about sums it up."

"Getting back to the Lab, it will become a very useful tool to identify whether or not wells are contaminated with just normal bacteria or with things that can cause harm, like E. coli. All the wells that are being surveyed are also having sampling done. About one-third of those are coming back with positive results for bacteria. Of those, we are resampling and then growing the sample in the incubator. So far all but one sample has grown 'bad stuff.'"

Carolin's Section sponsor ESC Lab Sciences provided free well-water analysis service for the project.



Photo Credit: Doug and Susan Rakoczy

Well Repair

Susan writes, "Yesterday, I went out with one of the Canadian team members and Edrick to do the second

round of sampling. It was still pretty cloudy and I was in the back of the open truck. At one point a Haitian man came over to me and was attempting to describe a well close by that needed work. After getting the full picture from Edrick, we went to see this pump, up the steep hill, into a little enclave of simple homes. The well did indeed need work! Evidently, a large truck or bulldozer [had] backed into it and pushed it over, twisted the handle and destroyed the concrete pump pad. Of course as is common, this incident took place and then [the driver] just drove away leaving the people in this area of many hundreds having to walk a long distance to get water. All we could do yesterday was document what had happened and say we will see what we can do.

“There are many broken wells, many wells that need to be cleaned, many wells that need to be replaced, and many wells that need to be drilled so that the current wells will last longer. It takes a lot of time and money. The government is not involved at all in drilling or repair in the rural areas. The challenge is great, but again, doing something is the first step.”

Sanitation Education

“We are finding it is not enough to just drill a well or fix a well; it needs to be clean water, not just water. There is so much education that needs to be done here in the villages to teach [the people] about keeping animals, laundry, bathing etc. away from the wells. But mostly, there needs to be education on [basic] sanitation issues i.e. latrines. They are few and far between.

“Let’s just say, while it is great to have water, it is even greater to know how to protect that water and in turn yourself and family. This is done through health and hygiene classes for the residents around the wells. It is the only long-term solution. Anyway, we will now have to decide how to go about dealing with all these contaminated wells that we are finding. One more step in the process.

“On the way home from taking the samples, it started to pour. It was cold and I was drenched. As I rode along in the open back of the truck, going past homes that are little more than shacks, seeing people waiting patiently under overhangs or trees, themselves getting wet, I realized afresh how fortunate I was to be going back to warm clothes, a dry house and hot food. Many

Haitians will see none of those things during this rainy time. I also saw again the beauty of the mountains, the open fields of rice patties, animals quietly grazing in marshy land and the laborers in the field, machete in hand, cultivating the field of beans. How can such beauty and such suffering exist together...and yet it does here in Haiti. Maybe that is why this is such a special place.”

Schools

“The school kids gathered around while on recess -- We really had to work to get them to back away from the drill. The school uniforms are not just for Catholic schools. In every Haitian school, kids wear uniforms (including the one our kids go to). Also, every child must pay to go to school in Haiti (even those going to government sponsored schools which are like our public schools). That is one of the things that continues the cycle of poverty in Haiti -- lack of ability for kids to access schools and education because their family can’t afford it and they don’t have a sponsor.”

This ends the emails by Doug and Susan from 2011.

2014 – Second Supply Effort

In 2012, Doug and Susan contacted Dave Duncklee again with a request for more well supplies. Once again, Geologic Exploration provided the riser pipe and well screen for shipment to Florida, from which it would go to Haiti. The Carolinas Section donated another \$700, which when combined with donations by geologists Dave Duncklee, Tom Dunham, and Tom Proctor totaled almost \$2000 for shipping the supplies and to cover import duties. The cost was significantly higher than for the supplies sent in 2011. Because the logistics and import duties were much more challenging, it took nearly two years for the supplies to finally arrive in Haiti in July 2014 the supplies arrived in Haiti—proof that it was not an easy task. Following is an email from Doug that explains how we are helping Lifewater provide training and equipment so that Haitians can install wells and supply their own citizens with potable well water.

“Hi Dave, I had been meaning to write before but with school so busy I just hadn’t had time. Now that school is over, I wanted to send a note to thank you, Tom [Dunham], Rick [Kolb], Tom [Proctor], Steve [Taylor, Geologic Exploration], and everyone else involved in trying to



Photo Credit: Doug and Susan Rakoczy

get the screen and casing to Haiti. I know things haven't gone as smoothly as last time, but that is why Susan and I appreciate everyone's efforts even more. Believe me, that screen and casing makes a BIG difference in the lives of many people.

"It would be impossible to spend almost three years living in Haiti and not come away significantly changed by experience. The level of poverty is hard to describe, and many people live without the basic necessities of life that we take for granted here in the US. The Lifewater people (and I mean all of the Haitians who work with us in the north of Haiti) work really hard each day to try and provide one basic necessity for life—clean water. Lack of clean water is a huge factor (probably the most important) in many health-related issues in third-world countries. When we first moved to Haiti, they were in the midst of a cholera outbreak that has since caused thousands of deaths. Cholera is easily treatable in this day and age, but you need to have access to clean water.

"The drilling we're doing is wash/mud rotary drilling with drills that are not very powerful. Two of the drills do not have any hydraulics and so it takes a long time

to get the drill rods out of the ground, and we have to use 5-foot rod lengths because there is no mast. One other drill does have a small mast but we can still only use 10-foot rods. It's hard to get the holes to stay open and get the wells set sometimes, especially if we're drilling to 100' or greater (which is often necessary to get a good well). That is why having the threaded casing is so important. It's quicker and less labor intensive to set the wells because the guys don't have to set 20-foot sections and glue them and wait for the glue to dry before they can put the next section on. It's also hard to set 20-feet of casing at a time, especially if you don't have a mast to lift up the casing. There are also times when it is hard to find 4-inch Sch 40 PVC. It's not like being in the U.S. where you can always quickly find whatever you need.

"Having the factory-cut screens is really important to the quality of the well. It's very time-consuming to have to use a saw to cut the slots by hand, it's not good for the structural integrity of the screen, and it's difficult to evenly space the slots so you can control the velocity of the water entering the well. There are a lot of issues with high turbidity and sediment in the well when you have

to hand-cut the screens, even if you take your time and do everything correct when you're constructing the well.

"The overwhelming majority of people Lifewater drills wells for (and we drill wells that MANY people use because we are drilling for communities, churches, and schools) do NOT have indoor plumbing or bathrooms or any kind of running water. They have to take their buckets or containers to the well and, using a hand-pump, get whatever water they need for all of their essential activities—drinking, cooking, washing, etc. They need to have good quality water because it is essential to their life, and having proper casing and screen goes a long way toward allowing them to have something that we in the United States and Canada take for granted because we can just go to the sink or bathroom and get all the clean water we need whenever we need it.

"I know it has been really challenging to get the casing and screen into Haiti this time. Susan and I have come to understand that is the way it goes sometimes and you just do your best to keep trying. That is why we appreciate everyone's efforts even more. *Lavi se difisil anpil nan Haiti, li se yon peyi di (Life is very difficult in Haiti, it is a hard country)*. But there are many wonderful, faithful, inspiring people who live there, and what all of you guys are doing does make a difference to them.

"Can you please forward this e-mail to everyone involved and tell them thank you very much from not only Susan and I but also Hanania, Edrick, Homil, Rony, Feden, Richard, Marvin, Junior, Henel, Merlyn, and everyone at Lifewater Haiti? We appreciate your help so much."

Here is what Doug writes about the locations of the water supply wells:

"The work is done in the northern plain of Haiti around Cap Haitien (the second largest city in Haiti, which is located on the northern coast, trending toward the northeast portion of Haiti). The lithology in the northern plain is sands grading into fine gravel with clay layers. There is an area from Plain du Nord down to Lory and Laggosett where there is a clay layer from about 75 or 80 feet that is up to 40 or 50 feet thick. If you get through that layer into the underlying sands we have had some flowing wells that produce up to 10 gallons a minute. You transition into the mountains pretty quickly if you get to far northwest, west, or south of the northern plain.

The mountains are either volcanic rock or limestone. We obviously can't drill in rock with the drills we have."

We asked Doug if they could use a rig for drilling in rock.

His response:

"It would be expensive to get and operate a bigger drill that is capable of drilling in rock, and it would be hard to get to a lot of places because the roads are so bad (and in many places non-existent compared to what we consider to be roads). It would be expensive to purchase a bigger drill and very expensive to get it into Haiti. In the mountains people use cisterns or bio-sand filters (to treat whatever water they can find) or if they are lucky maybe someone comes in on rare occasions with a bigger drill and people have to walk a long way to get to a well. There are some springs in the mountains in some places. Water is a problem in the mountains."

"One photo is from the foothills on the north side of the Northern Plain looking to the south across the northern plain. The one with the water flowing from the pipe is a well we drilled near Plain du Nord in May 2012. Went through a clay layer about 50 feet thick; once we got to the sands below it at about 120 or 130' the well was producing about 20 gallons a minute on its own. During the dry season it was making about 10 gallons per minute. The well was drilled at a school. We put a "T" on the piping coming out of the well with a valve. When the school needs water we open the valve and let it flow to the school. Otherwise it is piped to a drain ditch along the road where people come with their containers to get water whenever they need it."

How to Contribute

If you would like to contribute material, supplies, or other resources to these efforts, you can go to www.lifewater.ca—this is Lifewater Canada's website; Doug and Susan Rakoczy worked with them. Lifewater Haiti is the Haiti operation of Lifewater Canada. Alternately, you can contact Susan at lifewater.haiti@yahoo.com or feel free to contact Dave Duncklee at dave@dunckleedunham.com if you would like to be included in our team that is going to begin preparing a third shipment of supplies to Haiti.

Special Publication Series now open access

The first seven volumes of the Geochemical Society's Special Publications Series are now available in PDF for free on our website. The Geochemical Society periodically publishes a Special Publications Series. These are scientifically significant collections of related, original papers that honor renowned geochemists. The contributions appearing in these volumes are subjected to rigorous peer review supervised by the volume editors.

Open Access: In October 2014, volumes 1-7 were released as open access articles. To download the PDF files, click on the link to the volume above and then click on the individual papers to download them. Please note that SP#8 and SP#9 are not available as PDF.

A limited number of print volumes are still available for sale at very reasonable prices. GS and MSA members receive a 40% discount. Booksellers and libraries receive a 25% discount. For more information on purchasing a print edition of our special publication titles visit: [Order a Title](#).

[Vol. 1 – Magmatic Processes \(Tribute to H.S. Yoder\)](#)

[Vol. 2 – Fluid-Mineral Interactions \(Tribute to H.P. Eugster\)](#)

[Vol. 3 – Stable Isotope Geochemistry \(Tribute to Samuel Epstein\)](#)

[Vol. 4 – Victor Moritz Goldschmidt: Father of Modern Geochemistry](#)

[Vol. 5 – Mineral Spectroscopy \(Tribute to R.G. Burns\)](#)

[Vol. 6 – Mantle Petrology \(Tribute to F.R. Boyd\)](#)

[Vol. 7 – Water-Rock Interactions \(Tribute to D.A. Crerar\)](#)

NCKRI 2013-2014 Annual Report Available

Reprinted with Permission from NCKRI

NCKRI's newest Annual Report is now available for download. It summarizes our activities and growth from July

2013 to June 2014. Learn about our educational workshops, conferences, research projects, and much more. Just go to http://nckri.org/about_nckri/nckri_publications.htm and you'll find all of our annual reports, plus many other digital reports available for free download.

6th Ice Caves Workshop Proceedings Available

Reprinted with Permission from NCKRI

The 6th International Workshop on Ice Caves (IWIC-VI) occurred on 17-22 August in Idaho Falls, Idaho, USA. IWIC is the only conference focused on the state-of-the-art in ice cave research and is a function of the Glacier, Firn, and Ice Caves Commission of the International Union of Speleology.

IWIC-VI was the first IWIC held outside of Europe and was hosted by the National Cave and Karst Research Institute (NCKRI) of the USA. IWIC-VI was attended by people from 11 countries. They presented 20 papers and abstracts that cover ice caves and glacier caves in eight countries, three continents, and some extraterrestrial bodies. The 97-page proceedings were digitally published and are now posted on the NCKRI website for free international sharing. Go to http://nckri.org/about_nckri/nckri_publications.htm and look under the "Symposia and Special Papers tab" where you'll find it as Symposium 4. The major topics of the papers include modeling, measuring, and monitoring of ice and glacier cave processes, microclimates, and cave ice, as well as the effects of climate change. While you are at the NCKRI website, feel free to look around. You will find many other free publications that you can download. If you want a printed copy, all are designed and ready for you to print on demand.

The next IWIC will be held in 2016 in Postojna, Slovenia, hosted by our friends at the Karst Research Institute. The date has not yet been set. If you want to be notified of details of that conference, contact Dr. Andrej Mihevc (mihevc@zrc-sazu.si) to be put on the e-mail list.

AAPG URTeC Grows and Thrives



Photo Credit: AAPG

The second annual Unconventional Resources Technology Conference, which once again threw a multi-discipline spotlight on new approaches, technology and science being used to develop unconventional plays, attracted more than 5,000 – a 25 percent increase over last year's inaugural event – to Denver's Colorado Convention Center in late August.

More than 230 companies also exhibited at the event, which was sponsored by AAPG, the Society of Petroleum Engineers and the Society of Exploration Geophysicists.

URTeC, designed to be a multidisciplinary gathering of geoscientists who are advancing the science and practice of developing unconventional resource plays, is targeted at issues facing industry as it strives to mature asset team style communications and workflows to capture more hydrocarbons from these unique reservoirs.

The program's scope is from nanopores to production to reservoir modeling.

This year's meeting featured 193 oral sessions, 66 e-papers, short courses, field trips, intersociety workshops and a core exhibit featuring rock from 12 North American unconventional plays.

"We are very happy with the attendance this year," said AAPG President Randi Martinsen, "and I see tremendous potential for this meeting as the industry keeps pushing the frontiers on extracting hydrocarbons from unconventional accumulations.

"URTeC is a cutting-edge meeting that is extremely well suited to addressing the needs of the industry as

we strive to deliver additional oil and gas reserves to the country, and provide North America with energy security," she said.

Past AAPG president Lee Krystinik, chairman of URTeC's Management Committee, agreed that the conference itself proved to be a valuable resource for those in the industry's unconventional segment.

"As new concepts and technologies continue to evolve globally, I believe URTeC will remain at the epicenter of technical innovation," he said.

The next URTeC will be held July 20-22 in San Antonio, and the call for abstracts already has been issued.

The 2015 technical program will include 11 themes:

- Regional Case Studies.
- Characterization of Unconventional Reservoirs.
- Application and Integration of Well Data.
- Understanding Your Petroleum System.
- Optimizing Recovery from Unconventional Reservoirs.
- Integrated Approaches and Case Studies.
- Production Performance of Tight Oil and Gas Reservoirs.
- Social Performance (HSSE).
- Reserves Forecasting and Estimation.
- Long-Term Performance.
- Emerging Unconventional Plays.

To submit an abstract, or for more information, go to www.URTeC.org.

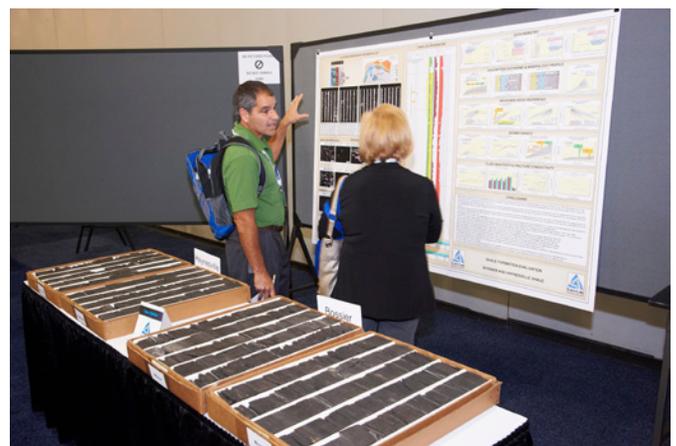


Photo Credit: AAPG

IAH Congress, Morocco

Reprinted with Permission From
John Chilton, IAH Executive Manager



Welcome from Madame Charafat Afilal, State Secretary for the Water Department, Ministry of Energy, Mines, Water and Environment. Photo Credit IAH.

This year for the first time the IAH Congress came to the Middle East and North Africa Region. Some 400-450 participants gathered in the impressive conference centre of the Ryad Mogador Hotel in Marrakech. Following some dramatic traditional Berber music and dancing, the opening session highlighted a welcome from Madame Charafat Afilal, State Secretary for the Water Department, Ministry of Energy, Mines, Water and Environment. Coming from a hydrogeological background herself, Madame la Ministre reminded us of the importance of groundwater to Morocco and of our responsibility to take care of such a precious resource. The first two invited keynote speakers built on this introduction by providing us firstly with very informative background on the national groundwater situation in Morocco and then more locally in the Tensift Basin which contains Marrakech.

The week's busy schedule continued with the usual mix of invited keynotes, parallel sessions and poster displays. The congress programme made space for meetings of IAH's Council, the Annual General Meeting, the Early Career Hydrogeologists' Network (ECHN) and meetings of other commissions and networks. A new development for congress was the first book exchange, with delegates bringing along their surplus hydrogeology-related books for the benefit of others. Proving a great success the idea will be repeated at future congresses and meetings.



Flooded route for field trip. Photo Credit IAH.

A definite attraction of programme was the series of post-congress field visits, and these did not disappoint; probably the best attended of recent congresses. Those who were lucky enough to cross the High Atlas to the southern oases experienced heavy early season rain. It was in fact slightly surreal to be walking over the sand dunes of Merzouga in pouring rain! We were told that it was the first two successive rain days there since 2006. On the way back from Merzouga, one route was closed due to flood damage and on the alternative route the group was obliged to wait a couple of hours for a river crossing to subside.

What of the overall reflections on the congress? Certainly there were some bumps along the way, which we will address to avoid recurrence at future congresses, but most participants will have left Marrakech with good memories of the congress and the old friends met and new friends made. For more information visit www.iah.org



Natural Karst Bridge & Waterfall, Atlas Mountains. Photo Credit: Dave Kreamer.

MSA 2015 Calendar

Order Publications Online (25% discount for MSA, CMS and GS members, except shipping)

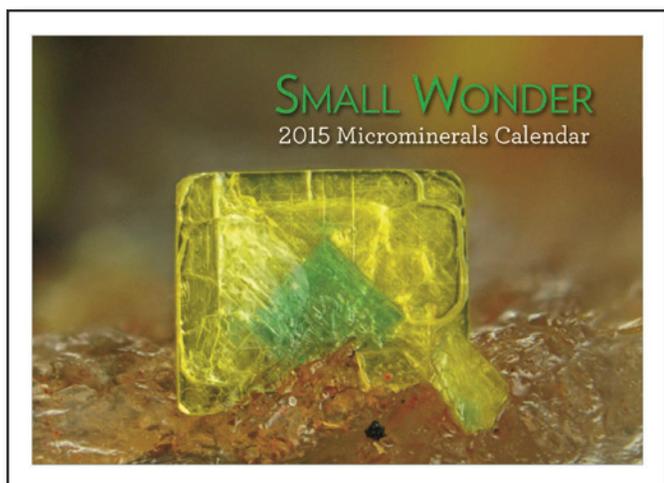
Reprinted with permission from MSA

**Author: Dona Leicht, Kristalle,
Laguna Beach, California**

**Edited by: Aleksandra Puhalo, Michael Bainbridge,
Iva Veselinova, Mike Jensen**

Layout and design by Gloria A. Staebler

**Illustrations by: Frédéric Hède, Robert O. Meyer,
Enrico Bonacina, Petr Fuchs, Kenneth G. Libbrecht,
Jean-Marc Johannet, Stephan Wolfsried, Matteo
Chinellato, Honorio Cócera-La Parra, Philippe Font**



2015 Calendar Cover. Photo Credit: MSA

Micromounting is the study and collection of mineral specimens that require magnification. The typical micromount is a group or single crystal that is only a few millimeters in diameter. Specimens are mounted in small boxes (usually less than 1 inch square) and are best viewed through a low-power, stereo microscope.

Mineralogists and collectors have for centuries delighted in what they saw under a microscope. Micromounting enables one to view a mineral in its highest state of perfection: the forms found in these tiny crystals are unmatched in larger specimens. Famed collectors such as George Fiss, George Rakestraw, Lazard Cahn, and Clarence Bement are among those who enjoyed this aspect of mineral collecting.

Rarity and diversity are probably among the more rational cases for micromounting — most minerals do

not form large crystals; only a few hundred of the more than 4,000 described species occur in crystals large enough to be seen without magnification. Indeed, most newly described minerals are microscopic. Economy is another factor: even the rarest microminerals can generally be had for a small sum, and a collector can store as many as 3,000 micromounts in a single cubic foot!

One of the most delightful aspects of micromount collecting is the camaraderie that affects this segment of the hobby in which money is rarely discussed. This international group of collectors routinely trade among one another, share their finds, and attend annual symposiums and events. The Baltimore Mineral Society, formed in 1951, is among the oldest mineralogical (or micromount) groups in the United States and over the years has counted among its ranks mineralogical personalities including Paul Desautels, Neal Yedlin, Paul Seel, and Lou Perloff. The Desautels Symposium is held each year in Baltimore, Maryland, and huge numbers of micromounters from around the world gather annually at the famous Tucson Gem and Mineral Show for another symposium.

Many of micromineral enthusiasts have developed the specialized skills and techniques necessary to photographing their tiny treasures, and are thus able to share them with an even larger community. This calendar showcases just a handful of these collectors, their passion and talent. We hope that you will enjoy this glimpse into the magnificent world of microminerals and invite you to learn more about these Small Wonders.

The calendar is published by Lithographie, LLC in cooperation with The Mineralogical Society of America, Martin Zinn Expositions, Tucson Gem and Mineral Society, Fine Mineral Shows and the Greater Denver Area Gem & Mineral Council.

LITHOGRAPHIE, LLC Post Office Box 11613, Denver,
Colorado 80211 USA

Telephone: +1 (303) 495-5521, Fax: +1 (303) 482-1238

info@lithographie.org

www.lithographie.org

Matt Joeckel Named Nebraska State Geologist

Reprinted with Permission from AASG
Mekita Rivas
University of Nebraska-Lincoln



Photo Credit: AASG and UNL

Robert Matt Joeckel has been named Nebraska state geologist. He succeeds Mark Kuzila, who stepped down after 16 years of service in the position.

“(Joeckel) is an outstanding scientist with a long history of working on important issues in the state of Nebraska,” said John Carroll, professor and director of UNL’s School of Natural Resources. “I can think of no person who is better qualified.”

The state geologist position is housed within the Conservation and Survey Division, a multidisciplinary research, service and data-collection organization in the School of Natural Resources.

“I am very appreciative of the opportunity afforded by the position,” Joeckel said. “I have the opportunity to work with a great faculty and staff, and I will always feel fortunate to work for the university in my home state.”

Joeckel joined the Conservation and Survey Division as a research geologist in 2000. He is curator of geology in the University of Nebraska State Museum and a fellow of the Geological Society of America. He has a doctorate in geology from the University of Iowa.

“(Joeckel) has contributed enormously to the museum as curator of geology, most recently with the new mineral

exhibits he has created,” said Priscilla Grew, director of the NU State Museum. “(He) will be an outstanding ambassador for our state.”

Joeckel said many challenges await the Conservation and Survey Division, the greatest of which is further demonstrating the significance of a geological survey in Nebraska.

“CSD faculty and staff have valuable prior expertise in the petroleum, environmental, engineering consulting and mineral industries, as well as other experience in the public sector,” Joeckel said. “All of us in CSD need to reassert the importance of earth-science data and expertise to a wide range of stakeholders within and outside of the university. A geological survey can make major contributions toward the resolution of the complex environmental and societal problems of the 21st century.”

Investigating the geological framework of the High Plains Aquifer and the paleoenvironmental record within Nebraska’s understudied ice age sedimentary record are among Joeckel’s research priorities for his tenure as state geologist.

“Nebraska’s geologic record and physical environment have and will continue to provide important data relevant to the understanding of global environmental systems, changing environments through geologic time and the evolution of life on this planet,” Joeckel said. “Some of our expertise also extends well beyond Nebraska and into the national and international realm. I take some pride in that expansiveness and I expect that we will build upon our very positive reputation.”

In 1871, an ad hoc geological survey was established within the University of Nebraska. Since then, nine individuals have served in the state geologist position. The Conservation and Survey Division was formally established in 1921 by state statute.

“I love geology and I love Nebraska too,” Joeckel said. “It’s great to practice my profession in a place in which there is still so much important research and outreach left to do.”

More details at <http://go.unl.edu/v8nz>.

AGI Welcomes New Leadership

Maureen Moses, AGI

The American Geosciences Institute cordially welcomes new officers for the 2014-2015 year: Dr. Scott Tinker as AGI President-Elect, and Mr. William Siok as the rising Secretary and Dr. Paul M. Bertsch as the Member-At-Large.

Dr. Scott Tinker was the 2013 AGI Awardee for Outstanding Contributions to the Understanding of Geoscience, namely for his work on the documentary Switch, co-produced with Harry Lynch as part of the Switch Energy Project. Tinker is actively engaged in building bridges between academia, industry, and government. In 2000, after 17 years in the oil and gas industry, Tinker joined the University of Texas at Austin, where he holds the Allday Endowed Chair in the Jackson School of Geosciences. He has given more than 500 invited and keynote lectures and visited nearly 50 countries. Dr. Tinker is the Director of the Bureau of Economic Geology and the State Geologist of Texas, and a past President of the American Association of Petroleum Geologists and the Association of American State Geologists.

Mr. William Siok recently retired as the Executive Director of the American Institute of Professional Geologists, a position he held since 1999. His role as Executive Director had him organizing, running and maintaining records of Executive Committee and Advisory Board meetings. Prior to being the executive director he was in hydrogeology, environmental engineering and waste management for over 40 years. Siok then pursued non-profit management which included fiduciary, personnel, technical, training, and regulatory responsibilities for the geosciences and the profession.

Dr. Paul Bertsch has experience with many AGI Member Organizations including the Clay Minerals Society, a Past-President of the Soil Science Society of America, the Geochemical Society, and the American Geophysical Union. He also has volunteered directly with the National Academy of Sciences, the National Science Foundation and the Department of Energy. He is a noted scholar in soil and environmental chemistry, but is the Director of the Tracy Farmer Institute for Sustainability and the Environment at the University of Kentucky.

AAPG Officer Candidates have been Announced for the 2015-16 term.

The person voted president-elect will serve in that capacity for one year and will be AAPG president for 2016-17. The terms for vice president-Regions and secretary are two years.

Biographies and individual information for all candidates will be available online in October.

Ballots will be mailed in spring 2015.

The slate is:

President-Elect

- Paul W. Britt, Texplora Inc., Houston.
- Gretchen M. Gillis, Aramco Services Co., Houston.

Vice President-Regions

- Adebayo O. Akinpelu, Fixital Ltd., Lagos, Nigeria.
- Peter M. Lloyd, Asia Pacific Training Ltd., Falicon, France.

Secretary

- Heather L. LaReau, Noble Energy Inc., Denver.
- Nicole S. Morris, FireWheel Energy LLC, Fort Worth, Texas.

SEG Visit the Online Store Today!
www.segweb.org

- e-doc files
- Special Publications
- Reviews
- Monographs
- Videos
- Journals & Newsletters

www.segweb.org/store

What is the craziest thing you have seen someone do in a cave?

Reprinted with Permission from NSS

Philip Rykwald, Author of Cave Chronicles

- There was once a naked race to as far as one could go in Honeycreek water cave. I think there were at least 15 participants... **Don Arburn**
- Leave the cave for the surface, what kind of weirdo would want to do that? **Nathan Roser**
- Got caught coming out of a cave on private property once. Owner asked us, "where did you all come from?" I said "coal mine collapsed. We been looking for a way out for 2 weeks." **Jeremy Langley**
- I had a buddy receive a fully iced birthday cake in the back of a cave in Germany. They dragged it the whole way through before surprising him. **Rachel Saker**
- In the early 90's I was on a mineralogical inventory trip to the Far East in Lechuguilla with Patricia Kambesis, Don Coons, and Dan Legnini. With camp packs it is a bit of a grind getting to the Far East camp. When we got there Don Coons pulled a 5-pound bag of apples out of his pack, held it up and said "Anybody want an apple?" I thought it was crazy that he carried 5 pounds of apples all the way back there! But I appreciated and enjoyed the apples! **Angela Morgan**
- Nov 12, 2010, three of us visited a horizontal cave near Guntersville Dam, Alabama. After being inside for about 2 hours, we caved out to find that a fire had been built 20 feet inside the entrance. Choking smoke filled the walking passage 300 feet back into the cave. The only way to get out was to crawl on the ground near the floor. I don't know who the people were that made the fire but seeing the smoke and the fire was crazy and stupid. **Troy Fuqua**

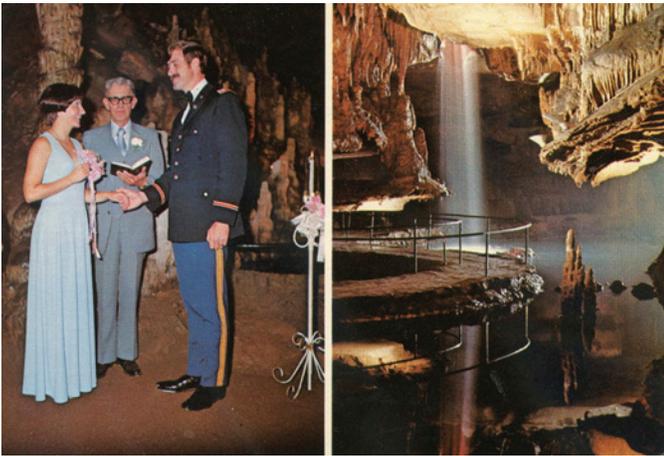


Millerton Lakes Cave (CA) was in flood during a spring-time visit. Eric Miles said he would climb the waterfall for a photo, and next thing I knew he had jumped in the water, which all poured through a tiny hole just below the second waterfall, a potential deathtrap. Photo Credit: Dave Bunnell

- I was crawling through a passage in a cave where there were several groups of cavers for the day. There was a guy in front of me that was not with my group. I don't remember his name and I've never seen him since. He suddenly stopped crawling and started slowly inching his head closer to the ceiling which was fairly low. I thought he was studying the soda straws when out came his tongue!!! Eeek!!! Tongue and lips all over the end of a soda straw!! I was speechless! He didn't say a word - just moved on like that was normal business for him. **Shannon Glenn #58268**

- My mother-in-law playing Handel's water music on a full size harp. (At my wedding). **Chrissy Richards**
- Last summer I was caving in West-By-God-Virginia and came across a large skeleton after travelling a good distance through maze passage with a few climbdowns. Didn't see how an animal could make it back there. To make a long story short, I notified a fellow caver of what I had found who was able to contact some scientists. In the fall I led a well-known paleontologist from the Smithsonian into the cave who determined it was a prehistoric cave bear, at least 500,000 years old. That was some crazy stuff. Also, upon exiting Glade Cave in Rockingham, Va, we were met by 2 skunks at the entrance which proceeded to chase us into the dark field. Those skunks were crazy as stuff. **Alex Mawdsley**
- Dennis Thompson (23923) pushed a squeeze through sharp breakdown, losing his pants, and continued crawling, over sharp rocks, in his "birthday suit" with his pants down to his ankles. I didn't see the whole thing because I didn't want to, but we could hear him groaning as he crawled through. He cleared rocks from the other side, allowing us through with less resistance. Some of the rocks had blood on them, but he said it was from his elbow. We hope that's all that was bleeding! The effort paid off with a beautiful section of cave, hundreds of feet of additional passage, and a back entrance to the amazing Taproot Cave. The squeeze became known as "Bare Ass Breakdown Pass". **Kevin Blackwood 60307**
- On every trip with Jim Fox I see a chaotic storm of crazy. Like when he forgot his helmet he just put a knee pad on his head in place of his missing helmet and caved all day with it... Or when he and his son passed a chest roller down Fantastic. Or when he passed out on the lip of Fantastic and took a nap. Or when he carried 6 frozen hot pockets for cave food and didn't thaw them out or cook them before eating them... Or when he climbed out of a narrow 25-foot pit on a Texas System with a broken foot loop while carrying a full DSLR camera setup, a second slightly smaller camera setup, a rotary hammer drill, bolting gear, caving gear, and three tree stand ladders... **Clinton Elmore**
- Came across a group of 4 guys sing a cappella show tunes. Little disturbing being the first out of a pit hearing that. **Jacob Kays**
- Carrying a gun. Near the exit we caught up with a guy who was carrying a handgun while leading a small group of novices. Not knowing what the nut would do next, we turned around and high tailed it out of there. **Dave Hunt**
- While in Sloan's Valley in the late 80's, we were making our way to the Screaming Willie's entrance. We heard yelling in a side passage and headed that way to investigate. We found a man practicing vertical ALONE in the cave. He had inverted. The friend I was caving with gave him a thorough brow beating before we helped him get back upright. Janice Tucker
- Back in the sixties a friend and I visited a cave in Alabama. About 1000 feet inside the cave we came across a shotgun and half a fifth of whiskey. This made us wonder what we may encounter ahead. Soon we met a rowdy group of 4 adults armed with guns and liquor. They had all just been released from jail and were celebrating their freedom. After convincing them we did not steal their shotgun and drink their booze we managed to get ahead of them and dropped down to a lower level thinking we were rid of them. We heard them coming above us so we extinguished our carbides and waited for them to pass. What we did not expect was the rain of vomit that came down from above as one of them let go. Fortunately it barely missed us. We finally got away from them and continued exploring the cave. On the way out we had the misfortune to run into them

again. This time they were arguing which way was out. One of the older men was waving his pistol in a threatening way and pointed it at us. I told him we had come in from the left passage hoping I was right as it was my first trip in the cave. We got them to the entrance hoping that would be the end of it. However we got the third degree about where our car was and I wasn't sure whether they were making us squirm or needing a car. We eventually eased away from them as pistol Pete started arguing with his buddies. Never went back to that cave. **Bill Walter**



Joel Sneed ties the knot in the former Sequoyah Caverns. Photo Credit: Joel Sneed & NSS.



Nothing quite brings out the crazy in some cavers like posing for photos. Above, Ellen Haber and Ray Hardcastle perform a "Caver's Magic Act". Photo Credit: Dave Bunnell

- Getting married! I did that once, and that marriage started out on the rocks and in the hole. **Joel M. Sneed**
- In 91 or 92 while I was rappelling Thunderhole in Putnam County, TN and a guy lit a fire in the mouth of the cave. It was smoking everything up, and I yelled at him to put it out. While I was ascending the pit he kicked a huge log that was on fire down the pit; it was quite sparkly and scary and it missed me by 10-15 feet. Sure looked like it would land on me though! **Jim Fox**
- [Someone] shoot a flare gun. **Aaron Addison**
- Decide it was time to go after the first shot was pulled into virgin passage. **Dan Lamping**

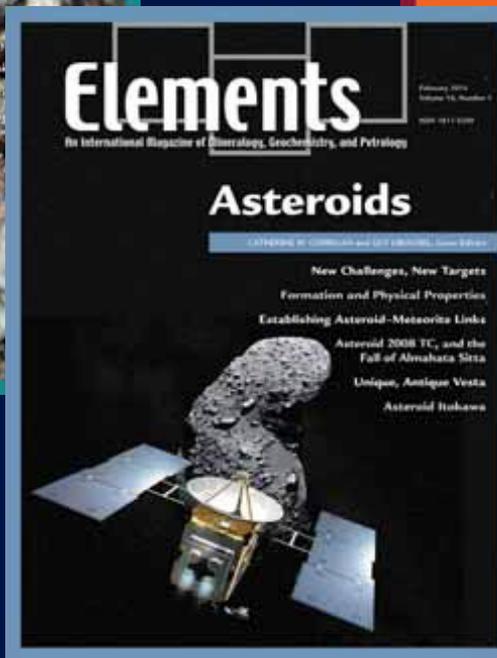
- Someone I know very, very well, about eight years ago took their daughter caving and we're having fun until he overestimated his ability and climbed down a thirty foot drop without a rope and could not get himself out and had to be rescued. A humbling experience, but a lesson learned about staying in caving shape. **Bruce Robtoy**

- Climb up a formation between walls that turned out to be just mud, not that strong or thick. **Linda Palit**
- In the early 1990s I walked a group of 8 or 9 News Agers with rawhide drums about 300 feet into a well-used, wild cave room to do a drum circle at their request. They all had a lawn chair, drum, a jacket and sources of light, but were in street clothes. Twenty foot ceilings so didn't bring helmets. While we were sitting there, drumming and rattling away, a college speleology field trip came in, outfitted as if for a week in Lechuguilla. (The whole cave is about 600 feet long). The professor started to read us the riot act, when I addressed him by name, and people in my group asked them to join us in "drumming up the spirits." **Jo Schaper**

- Dropping (yes DROPPING) vertical gear down a 120+ foot entrance drop that has multiple ledges— kerthuding the whole way down. We told them not to and were making plans for a rescue and didn't leave until all three spelunkers were out. Stupid but strong enough to overcome their kerjangled systems I guess. They all made it out by some miracle. **Amy Coelho Hinkle**
- Anne and I had descended into a cave and headed down the passage when we heard a strange sound - we returned to see our rope being pulled up! I had climbed onto a ledge and was getting ready to leap up and grab the rope when Anne yelled out and the person dropped the rope instantly. I remember the climb out and wondering whether they had started to untie the rope or what (I climbed first). That was a scary climb. No sign of anybody around. That was Kecks Pitt in Indiana during one of the conventions there. **Sidney Grindle**



Being flexible not only makes for good cavers but permits for more unusual poses. Johanna Kovarik strikes a pose in Roaring Road Cave in Alaska. Photo Credit: Dave Bunnell



PRINCIPAL EDITORS

John W. Valley
 Patrícia M. Dove
 Gordon E. Brown Jr.

AN INTERNATIONAL MAGAZINE

To keep abreast of the latest developments in mineralogy, geochemistry, and petrology

Published by 17 mineralogical and geochemical societies

CELEBRATING 10 YEARS OF PUBLISHING!

To receive *Elements*

INDIVIDUALS

Become a member of any of the participating societies:
www.elementsmagazine.org/societies.htm



INSTITUTIONS

Contact your book agent or the managing editor at
pierrette_tremblay@ete.inrs.ca

THEMATIC TOPICS IN 2014

- FEBRUARY – ASTEROIDS
 Guest Editors: Catherine Corrigan and Guy Libourel
- APRIL – OPHIOLITES
 Yildirim Dilek and Harald Furnes
- JUNE – KAOLIN: FROM ANCIENT PORCELAINS TO NANOCOMPOSITES
 Paul A. Schroeder and David L. Bish
- AUGUST – UNCONVENTIONAL HYDROCARBONS
 David R. Cole and Michael Arthur
- OCTOBER – COSMOGENIC NUCLIDES
 Friedhelm von Blanckenburg and Jane Willenbrg
- DECEMBER – GRAPHITIC CARBONS
 Olivier Beyssac and Douglas Rumble III

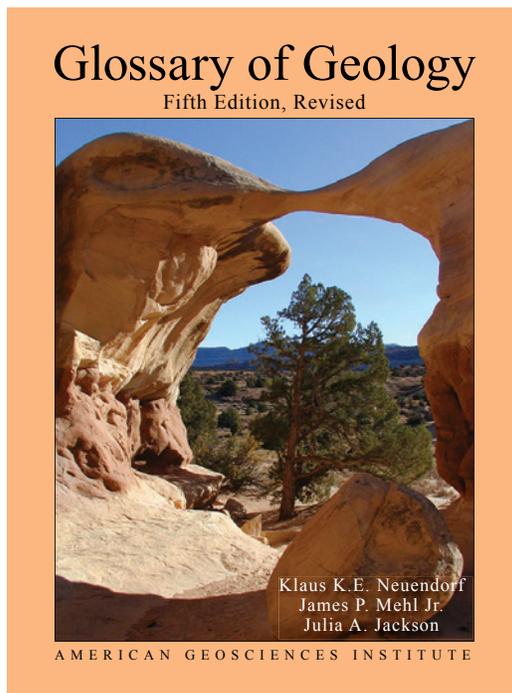


To order individual articles or assemble articles for a course pack: www.minpubs.org

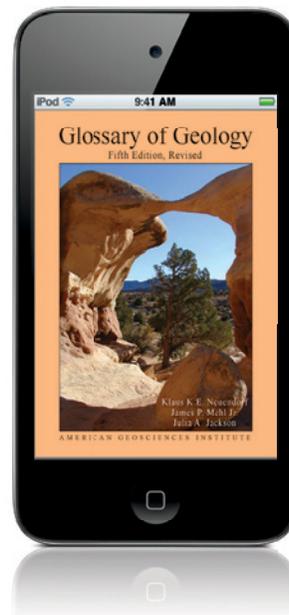
To order back issues: www.elementsmagazine.net

Elements is available online at
www.elementsmagazine.org
 and www.elementsgeoscienceworld.org
 Follow us on Facebook at www.facebook.com/elementsmagazine

How do you like **YOUR** Glossary?



Book?



**Palm of
Your Hand?**

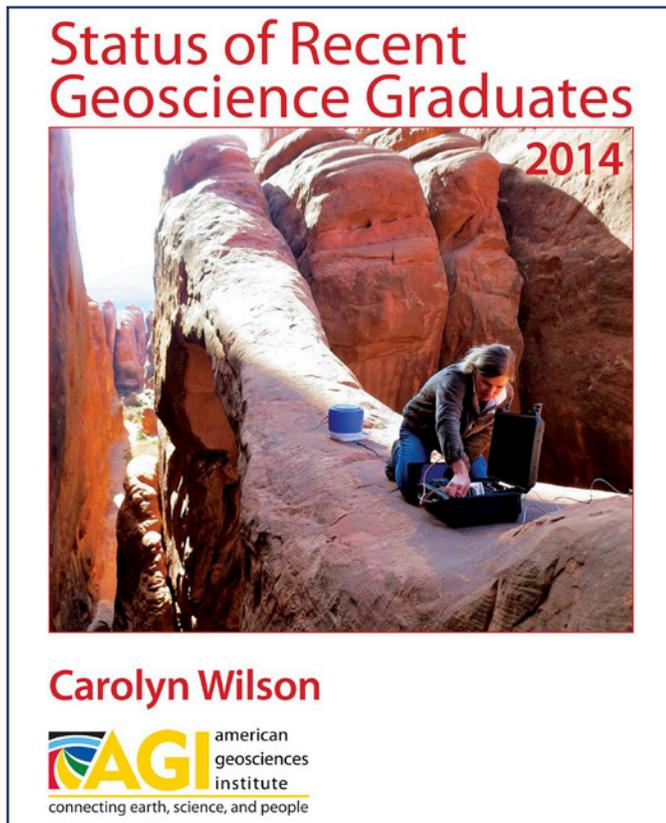


Order online at:

www.glossaryofgeology.org

Status of Recent Geoscience Graduates 2014: Jobs and Challenges Getting There

Carolyn Wilson
American Geosciences Institute



The American Geosciences Institute has released the 2014 Status of Recent Geoscience Graduates, which highlights the impact of booming enrollments and the challenges for students face in matching their education to the demands of the current hiring in the geoscience-related industries.

“Understanding the skills, knowledge and experiences of geoscience graduates is important because of upcoming changes to the geoscience workforce,” report author Carolyn Wilson said referencing a large population of baby boomers approaching retirement age. “This research has not been conducted prior to 2013 and it’s important we are able to characterize what a geoscience graduate looks like, and what they know.”

Many trends from 2013 are echoed in the 2014 study, and there was a 60% increase in participation from the geoscience community in this year’s study. However,

2014 did see the graduation rates of women increasing to almost equal or higher than that of men. Also, a Latino/Hispanic population dominated the percentages of those who self-identified as members of an under-represented population.

Two key trends continued in 2014, with an increasing number of geoscience graduates not participating in internships, and a shortage of available spaces to attend field camps and courses during the course of their studies. Both trends impact potential employability as work and field experiences remain top employer desires in new hires.

Social aspects of geoscience student experiences are also explored. Many students are drawn to geoscience by an appreciation of the outdoors, enjoying the interdisciplinary nature of the science, the influence of role models, and job security. Consistent with the 2013 report, students who graduate with master’s degrees tend to find jobs with higher annual salaries than doctoral candidates and those with salaries higher than \$90,000 are exclusively employed in the oil and gas industry.

When asked about what picture is emerging from researching recent geoscience graduates Wilson said, “Since this kind of research has not been previously done, we are now able to provide supporting data to the often anecdotally cited issues, most of which are neither new or surprising, only now we are able to back it up.”

To download the report: <http://bit.ly/1xwNOpf>

SME Submits Comments to the White House on Critical Minerals Supply Chain Focus is on a pipeline of qualified workforce

**Reprinted with Permission from SME
John Hayden, Deputy Executive Director
Public Affairs and Government Relations**

The Society for Mining, Metallurgy & Exploration Inc. (SME) has submitted comments to the White House Office of Science and Technology Policy regarding its request for information about critical and strategic materials supply chains and their importance to American prosperity and national security. SME’s comments

focused on the role of maintaining an adequate pipeline of qualified graduates and teachers at U.S. mining schools in order to provide the necessary technical skills needed to maintain the supply chain of critical and strategic minerals.

“Workforce availability has become a significant problem for the domestic mining industry,” said SME Executive Director David L. Kanagy. “By 2029, more than half of the current workforce will be retired, and the number of qualified science and engineering professionals graduating from U.S. schools will not meet the capacity required to fill these vacancies.”

Mining and geological engineering, mineral processing, extractive metallurgy and applied geology and geophysics programs at our universities are national assets that are critical to maintain and encourage the growth of the U.S. energy and minerals workforce. These programs suffer from dwindling federal reinvestment and R&D funding. Without an adequate pipeline of qualified graduates and faculty at U.S. universities, the nation is at a distinct competitive disadvantage in the production of basic raw materials and energy. SME’s position is reflected in the March 2013 SME technical briefing paper, “Federal Support for U.S. Mining Schools.”

The AAG Careers in Geography brochure is geared toward recruiting both upper-level high school and undergraduate college students to geography courses, geography majors, and possible careers in geography.

New AAG Brochure Informs, Inspires Students About Geography Jobs

David Coronado, AAG

The six-panel, Careers in Geography brochure color brochure is designed to speak directly to students, with lively graphics portraying young people engaged in the exciting and socially meaningful activities of geography today.

Geography departments, college admissions offices, schools, and guidance counselors can obtain copies of the Careers in Geography brochures by contacting the AAG central office, or by mailing or faxing in the Order Form. We hope you will find this an effective tool

in attracting new students to your program and to the study of geography.

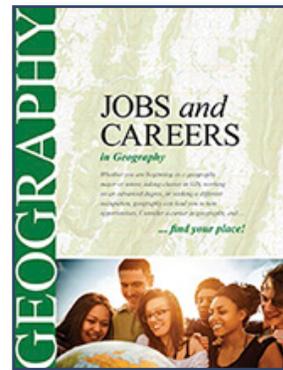


Photo Credit: AAG

For more information on careers in geography, visit the Jobs & Careers section of our website (www.aag.org/careers). Download the brochure order form [here](#).

Call for Participation: Geography Careers Events at the AAG Annual Meeting

David Coronado, AAG

For each of the activities below, we seek a diverse group of individuals representing a range of employment sectors, organizations, academic and professional backgrounds, and racial/ethnic/gender perspectives. If interested, please send an email to [careers \[at\] aag \[dot\] org](mailto:careers[at]aag[dot]org), specifying your topic(s) and activity(s) of interest, and attach your current c.v. or resume. For best consideration, submit your information by December 5, 2014.

Career Mentors

Career mentoring sessions provide an open forum where students, job seekers, and professionals can get advice, feedback, and information. We seek volunteers representing the business, government, nonprofit, and academic/educational sectors to provide informal consultation during your choice of designated times during the conference.

Workshops

The AAG is planning workshops on GISP certification, strategies for entering the workforce, career planning for recent and prospective graduates, and professional networking. We seek members to help lead and facilitate these workshops, and we also welcome proposals for

additional workshops related to careers and professional development.

Panel Sessions

We seek organizers and panelists for sessions on topics such as:

- Employment in the business, government, and non-profit sectors
- Preparing for and sustaining an academic career
- Integrating career preparation into geography programs and curricula
- The role of community college and undergraduate programs in career preparation
- Enhancing students' employability through internships and work-based learning
- Working internationally

Paper Sessions

AAG staff will be organizing several paper sessions on topics related to careers and professional development. To present in one of these sessions, please submit your abstract at www.aag.org/annualmeeting. When you receive confirmation of a successful abstract submission, please then forward this confirmation to: [careers \[at\] ag \[dot\] org](mailto:careers@ag.org). The abstract deadline is November 5, 2014.



connecting earth, science, and people

24 July 2014

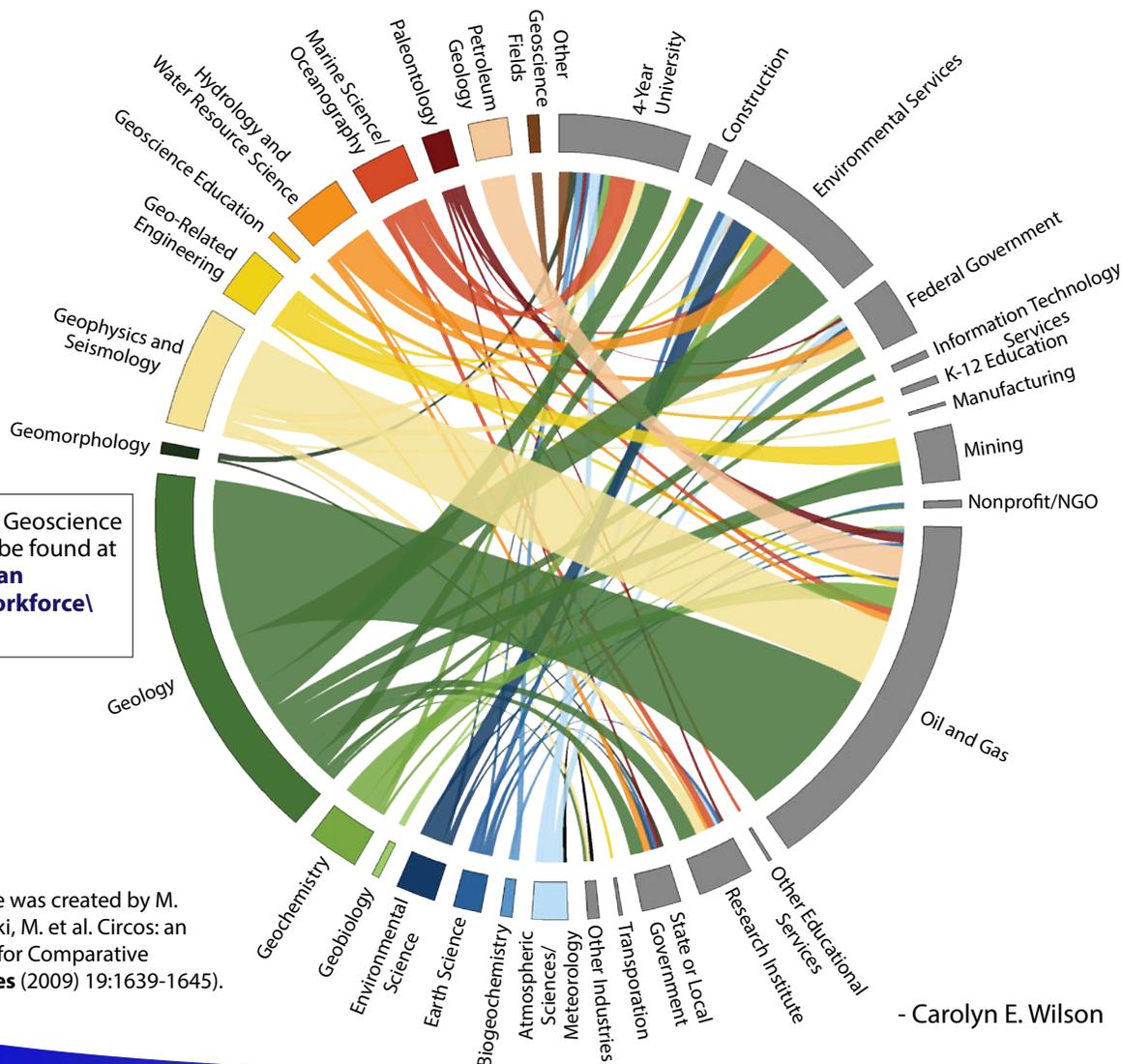
GEOSCIENCE CURRENTS

No. 90

The Industries of Geoscience Graduates' First Jobs by Degree Field

The circular¹ diagram below displays the connection between the degree fields of recent geoscience graduates (in color) to the industries where these geoscientists found their first job after graduation (in gray). The size of the bars along the outer edge of the circle represent the number of recent graduates that pursued a particular degree field and entered a particular industry. Each colored, inner ribbon connects a particular degree field with the various industries where graduates found jobs. The thickness of each ribbon is determined by the number of graduates within each degree field with a job in a particular industry. This visualization shows the variety of industries available to graduates with a geoscience degree, as well as the complexity of the workforce and knowledge needed in the distinct industries.

The data presented here came from the 2013 and 2014 results of AGI's Geoscience Student Exit Survey. Look forward to the Status of Recent Geoscience Graduates 2014, which will detail the survey results for the 2013-2014 academic year, available in September.



The Status of Recent Geoscience Graduates 2013 can be found at <http://www.americangeosciences.org/workforce/reports>.

¹ The visualization code was created by M. Krzywinski (Krzywinski, M. et al. Circo: an Information Aesthetic for Comparative Genomics. *Genome Res* (2009) 19:1639-1645).

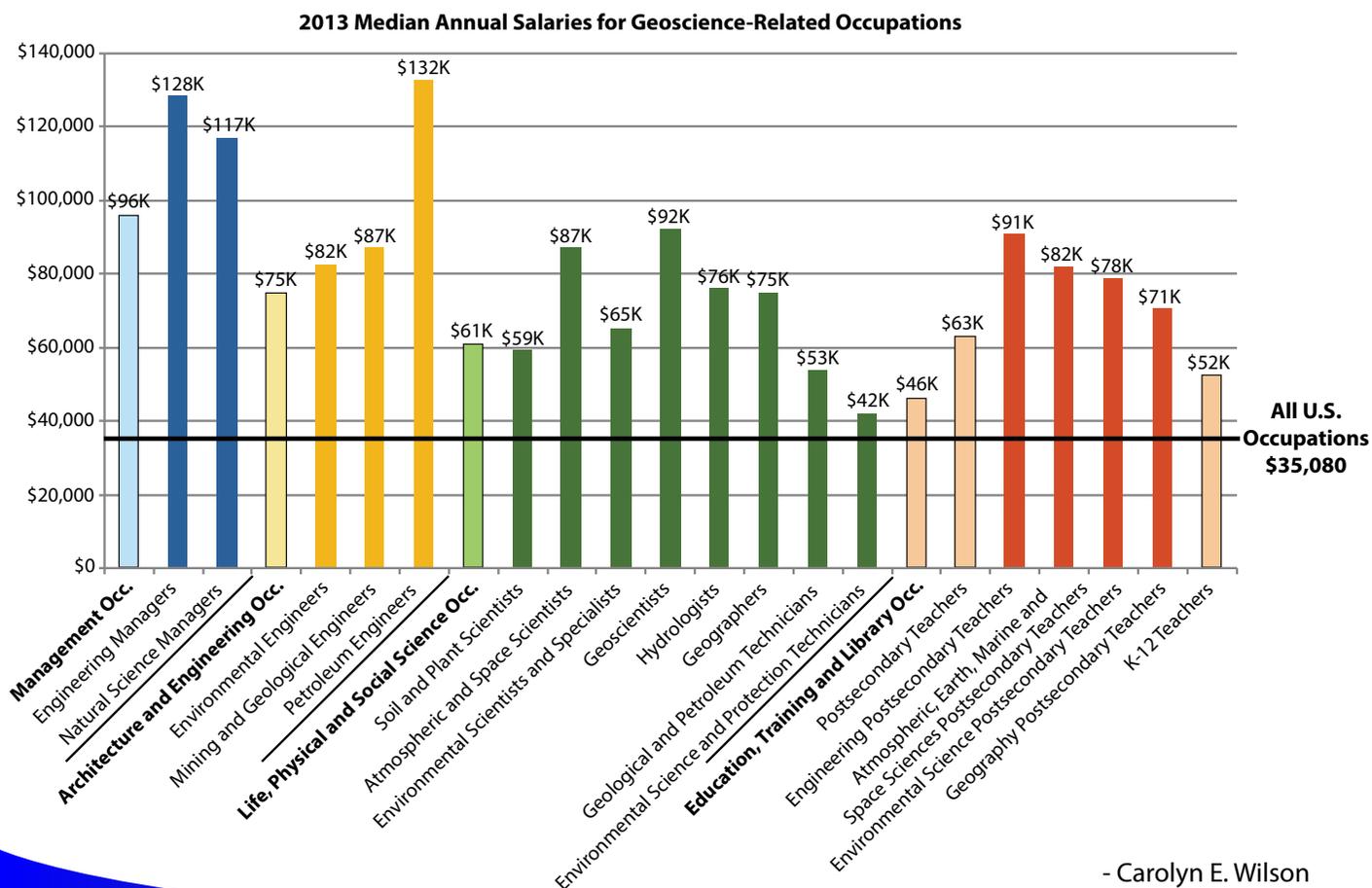
- Carolyn E. Wilson

2013 Median Salaries for Geoscience-Related Occupations

The graph shows the 2013 median annual salaries for geoscience-related occupations in the United States as reported by the U.S. Bureau of Labor Statistics. The colors represent a different occupational category. The columns in the lighter colors display the annual median salary for a broad occupational grouping. The darker colors are specific geoscience occupations within the broad occupational groups. Except for soil and plant scientists and technician occupations, the median salaries for the geoscience occupations are higher than the median salaries for the broader occupation groups. The average median annual salary for geoscience-related occupations in 2013 was \$83,311.

Since 2011 (*Currents #62*), all but five (atmospheric and space scientists, geographers, environmental science and protection technicians, engineering postsecondary teachers, and atmospheric, earth, marine and space sciences postsecondary teachers) of the geoscience occupations saw increases in their median annual salaries, and the decreases ranged only from \$10-\$2760 per year. Petroleum engineers had the highest increase in median annual salary since 2011 jumping by over \$10,000.

The geosciences continue to be a lucrative employment option within the current workforce.



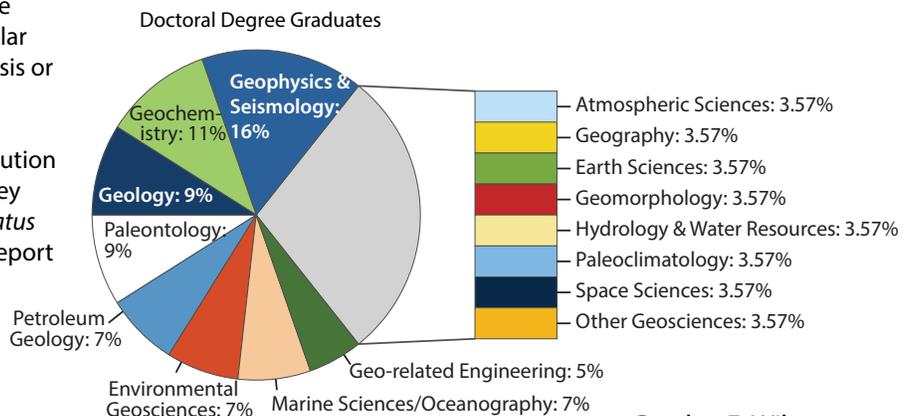
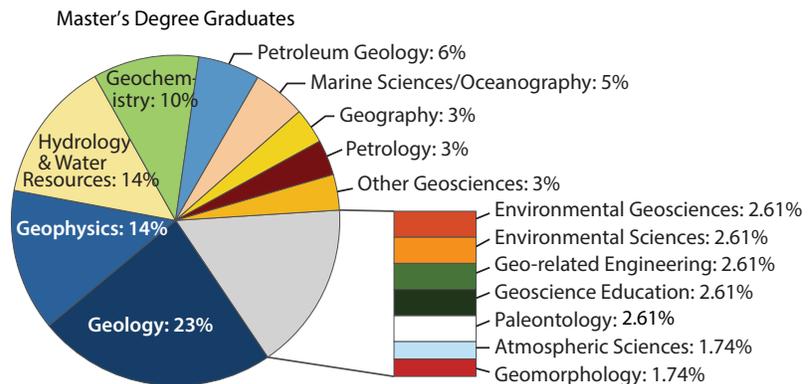
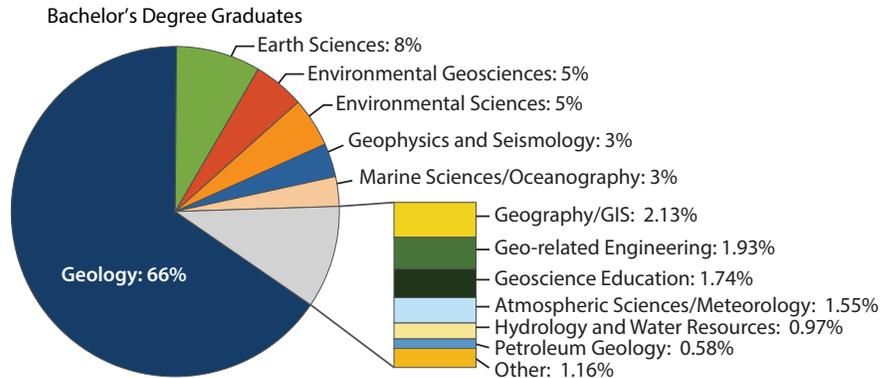
- Carolyn E. Wilson

Chosen Degree Fields of Geoscience Graduates in the 2013-2014 Academic Year

In the fall, spring, and summer of Academic Year 2013-2014, AGI distributed AGI's Geoscience Student Exit Survey nationally to students graduating with a bachelor's, master's, or doctoral degree in a geoscience field. The survey generated 688 responses from 167 different departments. Out of the 688 responses, 517 came from bachelor's graduates, 115 came from master's graduates, and 56 came from doctoral graduates. Using AGI's graduation data from 2013, this sample size was determined as considerably large enough to represent the population of geoscience graduates.

The pie charts display the chosen degree fields of the geoscience graduates. Geology continues to be the most popular degree among undergraduates with students specializing in different fields more often in graduate school. The "Other Geosciences" categories represent degree fields such as economic geology, petrology, mineral physics, and paleomagnetism. For bachelor's graduates, the "Other" category also includes a few interdisciplinary degree fields created specifically for a particular department that allows for an emphasis or minor in a geoscience field.

More data from the 2013-2014 distribution of AGI's Geoscience Student Exit Survey will be published in the upcoming *Status of Recent Geoscience Graduates 2014* report due out in September.



- Carolyn E. Wilson

Figures created by Kathleen Cantner

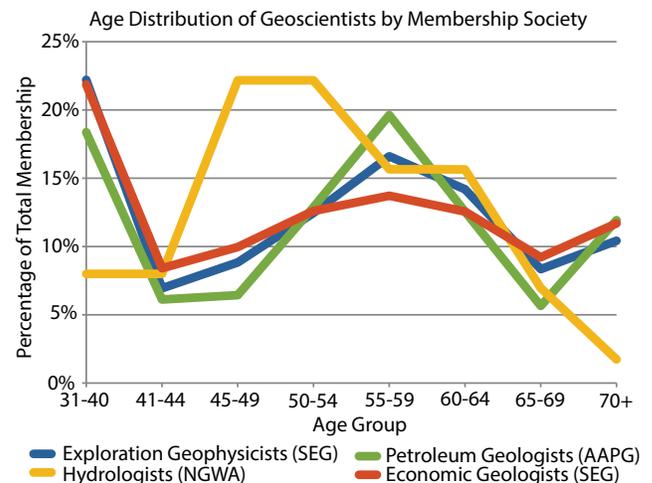
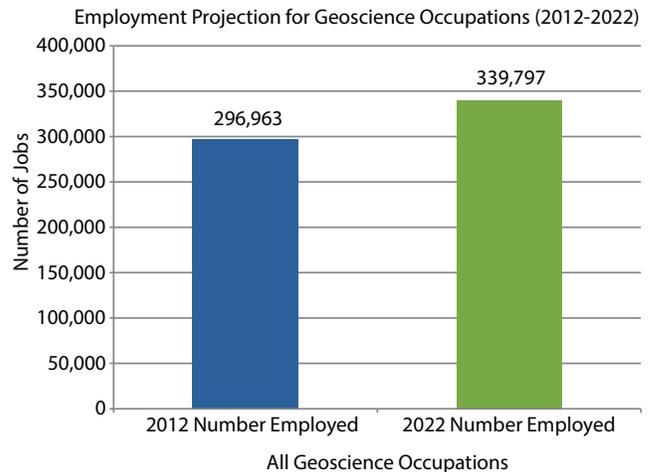
Explanation of the Predicted Geoscience Workforce Shortage

In the Status of the Workforce Report 2014, a future workforce shortage of 135,000 geoscientists was shown. This Currents expands on the process of determining this estimated workforce shortage.

The data used to look at the future supply and demand of geoscientists come from multiple sources: the Bureau of Labor Statistics (BLS), multiple AGI member societies, and AGI's Directory of Geoscience Departments (DGD). BLS annually publishes their U.S. employment numbers for both industries and occupations. BLS also releases projections of their expected employment numbers 10 years into the future. Due to variations in the definitions of the geoscience workforce, AGI has set a definition of the geosciences and has identified the reported occupations associated with that definition. Multiple AGI member societies shared the age distribution of their membership to help provide an insight into the age demographics of the workforce. For the DGD, AGI asks departments to provide their enrollment and graduation numbers each year when they update their information.

The total number of geoscientists employed in 2012 and projected to be employed in 2022, 296,963 and 339,797 respectively, were calculated from the employment numbers provided by BLS. The total number of future graduates, approximately 51,000, was calculated based on the number of 2013 graduates. Many departments are at capacity, so no increase in new graduates over time was used. The age distributions of the member societies were used to estimate attrition from retirements with a median retirement age of 65. Accounting for the combined projected increase in jobs with the estimated attrition rate along with the estimated number of graduates over the next 10 years, AGI has estimated a shortage of 135,000 geoscientists by 2022.

This estimate is created using multiple assumptions, such as nearly all geoscience graduates find careers in the geoscience workforce (they don't), the expected percentage of the current employment will retire at or near 65, and no major changes occur to the economy that might directly affect the workforce. However, AGI shares this number to make two critical points. The geosciences will continue to be a lucrative field of employment over the next decade. A large number of current geoscientists are reaching retirement, which could lead to a major loss of skills and knowledge from the future workforce.



- Carolyn E. Wilson

Challenges Recent Graduates Overcame to Complete Degree

Recent geoscience graduates were asked to describe their greatest challenge to completing their degree. The table highlights the most cited challenges by students, along with the percentage of graduates that faced the challenge and example comments from students. Thirteen percent of graduates either did not respond to the question or did not feel they faced a major obstacle while working towards their degree.

The majority of graduates had trouble with specific classes. The classes most often cited were Calculus I, Calculus II, and Physics; even students that completed a graduate degree mentioned difficulty in these courses as an undergraduate. However, a few students mentioned their capstone or thesis work as challenging. Financial issues were also mentioned frequently, and were coupled with other challenges, specifically related to balancing school and work and time management. Personal issues were often cited by students relation to motivation. Interestingly, 5 percent of graduates mentioned issues with the faculty in the department, such as disrespect, poor teaching skills, and lack of advisement. Other challenges cited by multiple graduates include choosing their major too late (4%), issues with advisors and/or committee (3%), and issues with the administration at the university level (3%).

These responses are enlightening and raise two major questions. What can be easily changed within departments to mitigate these obstacles? How many potential geoscience majors have been lost due to these obstacles?

Identified Challenges	%	Sample Comments: BA/BS Graduate	Sample Comments: MA/MS Graduate	Sample Comments: Phd Graduate
Trouble with a Specific Course	25%	"Having to take non-geology related coursework such as Calculus, Chemistry, and Physics. I feel I would have done better in those courses if they were offered with respect to geology."	"Lack of prior academic experience in geology as an earth science, so the learning curve on the fundamentals was steep. The engineering part was much easier for me."	"I was not used to do research, it was hard to see the big implications."
Financial Issues	15%	"Passing environmental geochemistry and maxing out my student loans so not being able to afford field camp."	"The amount of money required to complete an additional degree was a large consideration before deciding to pursue this degree. Student loan debt almost caused me not to enroll."	"Financial. I've worked full time out of school during the majority of my college career including the majority of my Ph.D."
Personal Issue/ Concern	15%	"Entering my junior year of college, I began to suffer from academic burn-out. I also wasn't sure where I wanted to go with my degree(s) and what kind of work I wanted to do. I felt like I wasn't as smart or capable of doing things as I'd used to be."	"Currently in my MS program, it is being away from family with a 6 year old, lack of enthusiasm about my thesis, and lack of motivation from my advisor so it's taking more time to write than it should."	"Frustration and isolation when research wasn't going well."
Time Management	12%	"The greatest obstacle to completing my degree was getting classes to meet my schedule. I am a married father of three that worked full time the first half of my college career. Balancing my home life with a family with school demands has been difficult."	"Balancing my life with school. As an adult that did not go straight to college, it was difficult to balance my life and my relationship with the rigors of pursuing an advanced degree."	"Personal time management"
Issues with Course Availability	7%	"I was frustrated by the limited course offerings, since our department is so small. I spent two semesters taking courses outside of the department. By the time senior year started, none of our course offerings thrilled me."	"The greatest obstacle was not having a wide variety of classes to pick from and only having 2 graduate faculty to teach those classes."	N/A
Balancing Employment and Studies	6%	"Time and Money. Geology labs and field classes are very time consuming and often require expensive equipment and time off work. For students that don't receive money from family, this is difficult to manage."	"The greatest obstacle was working through college while also trying to find internships, which are crucial in this field."	"I had a child and went to work full time to support my family. Working and finishing a graduate degree is really, really hard."
Issues with the Professoriate	5%	"Sometimes teacher was very disrespectful and insulting; made me feel very inadequate and unimportant."	"Sometimes feel lacking of good professor."	"Graduate level courses in seismology were poorly taught by reluctant faculty that under-valued providing the fundamentals in course material!"

- Carolyn E. Wilson

Discover More

The Next Generation Thermo Scientific™ GC-IRMS solution provides a significant step forward in analytical performance and capability for compound-specific isotope analysis meeting the analytical challenges of today's rapidly expanding isotope ratio world. The isotopes ^{13}C , ^{15}N , ^{18}O and ^2H in complex GC mixtures provide scientists with a wealth of information uncovering the history and origin of samples.

using Next Generation GC-IRMS

• Visit thermoscientific.com/GC-IRMS

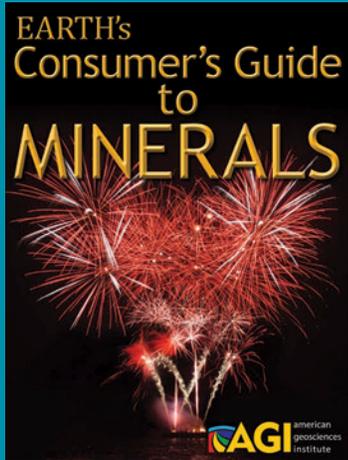


**Thermo Scientific
GC-IRMS Solution**
Delta V™ Isotope Ratio MS
TRACE™ 1310 GC
GC IsoLink II™ Preparation Unit
ConFlo IV™ Universal Interface



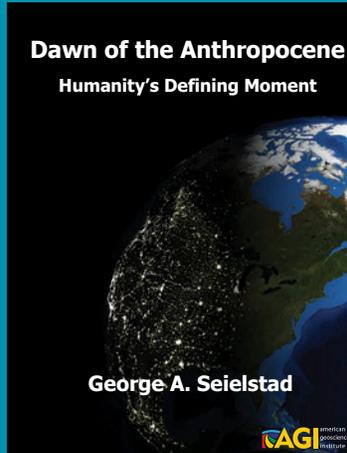
© 2014 Thermo Fisher Scientific Inc. All rights reserved. All trademarks are the property of Thermo Fisher Scientific and its subsidiaries.

DIGITAL GEOLOGY



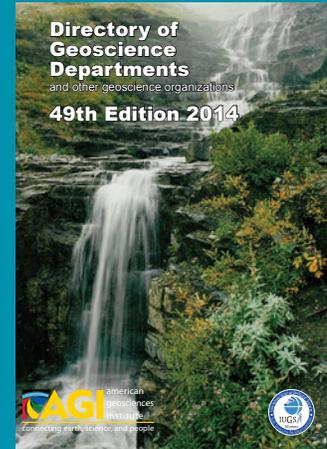
The Consumer's
Guide to Minerals

\$4.99



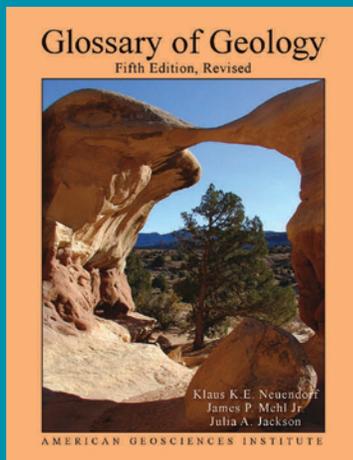
Dawn of the
Anthropocene

\$4.99



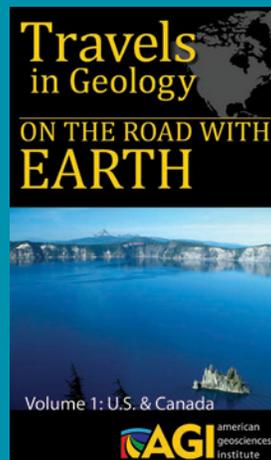
Directory of Geoscience
Departments

\$9.99



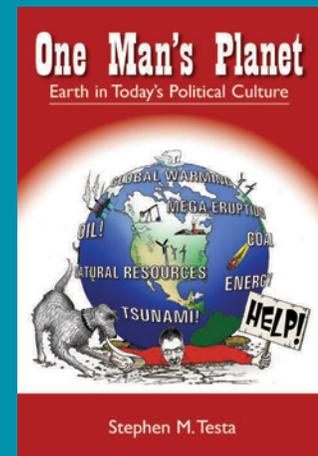
Glossary of Geology

\$49.99



Travels in Geology

\$4.99



One Man's Planet

\$2.99

www.agiweb.org/pubs

 **AGI** american
geosciences
institute
connecting earth, science, and people

 **amazon.com**

Earth Science Week 2014 a Global Success

Geoff Camphire
American Geosciences Institute

An estimated 50 million people worldwide gained awareness of the geosciences through the 17th annual Earth Science Week, October 12-18, 2014. The event, organized by AGI, celebrated the theme “Earth’s Connected Systems” by promoting awareness of the dynamic interactions of the planet’s natural systems.

Earth Science Week 2014 learning resources and activities engaged young people and others in exploring the ways that geoscience illuminates natural change processes. Students learned that by deepening our understanding of interactions of Earth systems including the geosphere, hydrosphere, atmosphere, and biosphere, Earth science helps us manage our greatest challenges and make the most of vital opportunities.

Events ranged from students conducting classroom science projects to activities at science centers and museums. The week was jam-packed with special events held on “Focus Days,” which focused on different areas of Earth science:

- International EarthCache Day (Sunday, October 12)
- Earth Science Literacy Day (Monday, October 13)
- No Child Left Inside Day (Tuesday, October 14)
- National Fossil Day (Wednesday, October 15)
- Geoscience for Everyone Day (Thursday, October 16)
- Geologic Map Day (Friday, October 17)
- International Archaeology Day (Saturday, October 18)

In addition, two city-specific celebrations served as major centers of public awareness activities. “Earth Science Week Houston” and “Earth Science Week Denver” both extended and deepened the reach of the campaign with special events, educational materials, online resources, and activities. In Houston, major partners included the Houston Geological Society, the Houston Museum of Natural Science, and the Consumer Energy Alliance. In the Denver area, partners included the Colorado Scientific Society, the Colorado School of Mines, and the Society for Mining, Metallurgy and Exploration. To support these celebrations, AGI donated hundreds of Earth Science Week Toolkits to schools in the cities’ public school systems.

The Earth Science Week 2014 Toolkits, distributed to thousands of science educators nationwide, provided dozens of materials for use in the classroom. Teachers and students gained access to a school-year activity calendar, a new program poster including a learning activity, material on geoscience resources from USGS, NASA education materials on Earth system science, a genuine field notebook from Rite in the Rain, National Park Service poster on caves of the national parks, planetary change material from Howard Hughes Medical Institute, an Energy4Me poster on energy science, material on climate from the Department of Energy, and a “Geographic Groceries” poster from National Geographic.

Just in time for Earth Science Week 2014, AGI launched a redesigned website for the program. The new site offers a more attractive presentation, streamlined functionality, and user-friendly interface. With Internet access, teachers and students learned, they could explore Earth science all year long. The Earth Science Week website offers videos, webcasts, Spanish-language resources, research projects, local events and organizations, social media links, and careers information. Most importantly, the site features hundreds of recommended lessons that teachers and parents can conduct with children.

Specifically, program participants went online to use a new educational resource of the Earth Science Week website, the “Be a Citizen Scientist” page, which features information and links for recommended “citizen science” programs focusing on Earth science. Such projects offer great ways to become actively involved in the scientific process. The page is supported by the U.S. Geological Survey, a longtime Earth Science Week partner, which sponsors or has partnerships with many citizen science programs.

Once again, hundreds of people entered the three national contests for Earth Science Week. The photography, visual arts, and essay contests - all focused on the event theme of “Earth’s Connected Systems” - allowed both students and the general public to participate in the celebration, learn about Earth science, and compete for prizes.

And the success of Earth Science Week would not be possible without the support of longstanding sponsors such as the USGS, NASA, the National Park Service, AAPG Foundation, AGU, GSA, SME, AASG, National Geographic,

and Esri. With the tax-deductible contributions of program sponsors like these, Earth Science Week can continue promoting awareness of the important role that geoscience plays in society.

Minerals Education Coalition Promotes Earth Science Week

Reprinted with Permission from SME
John Hayden, Deputy Executive Director
Public Affairs and Government Relations

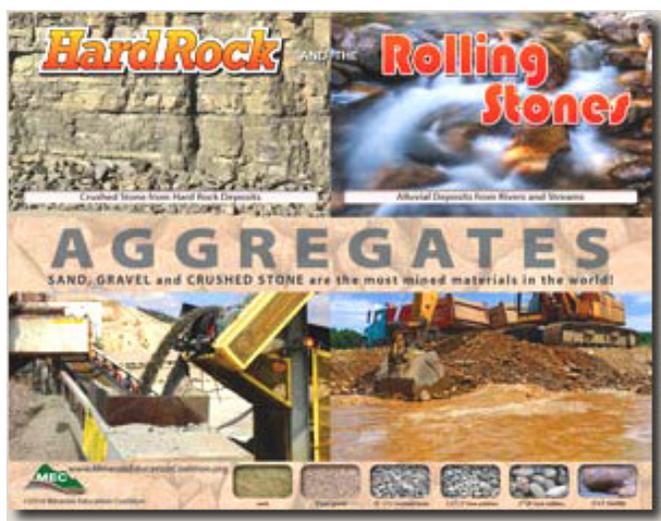


Photo Credit: SME Minerals Education Coalition

The Minerals Education Coalition (MEC) of the Society for Mining, Metallurgy & Exploration Foundation (SMEF) is partnering with the American Geosciences Institute (AGI) to support Earth Science Week 2014. MEC's new poster "Hard Rock and the Rolling Stones: Aggregates" and the "Aggregates Matter" activity calendar page are part of AGI's Earth Science Week Toolkit.

The back of MEC's aggregates poster has four activity pages that teachers can use in their classrooms. 16,000 packets are available to teachers at www.EarthSciWeek.org. Earth Science Week is October 12-18, 2014, and will celebrate the theme "Earth's Connected Systems."

"MEC is proud to participate in the annual Earth Science Week campaign to reach teachers and students across the nation and internationally," stated SME Executive Director David L. Kanagy. "By partnering with AGI, we are able to reach a broad audience to further our goal of creating an enlightened and supportive public

that appreciates the importance of mining and minerals to their daily lives."

Since 1998, AGI has organized this international event to help the public gain a better understanding and appreciation for the Earth sciences and to encourage stewardship of the Earth. SME and MEC are proud to partner with AGI in promoting Earth Science

Week objectives:

- To engage students in discovering the Earth sciences.
- To remind people that Earth science is all around us.
- To encourage Earth stewardship through understanding.
- To motivate geoscientists to share their knowledge and enthusiasm about the Earth.

As the premier educational program of the SMEF, the MEC develops and distributes K-12 education and public outreach materials promoting an awareness and appreciation of the mining and minerals industries. These materials will be featured along with other sponsors and program partners including the U.S. Geological Survey, American Association of Petroleum Geologists Foundation, U.S. National Park Service, U.S. Department of Energy and the National Aeronautics and Space Administration.

After October 1, two more educational items from the MEC will be available to teachers for Earth Science Week. Teachers can use the Aggregates Teacher Guide at www.MineralsEducationCoalition.org/k-12-education to get the most out of all of MEC's aggregates-related materials. The teacher guide will include answer keys and extension activity ideas for the MEC poster and related AGI calendar page, as well as links to other MEC resources and additional aggregates-related links. MEC will also offer an instructional video at <http://www.earthsciweek.org/eswdenver> showing teachers how to get the most out of all of MEC's online resources. For more information, visit www.MineralsEducationCoalition.org.

New Teaching Materials from InTeGrate

InTeGrate is pleased to announce the publication of five new modules of teaching materials on its website.

Natural Hazards and Risks: Hurricanes

Developed by Lisa Gilbert (Williams College), Josh Galaster (Montclair State University), and Joan Ramage (Lehigh University), this two week teaching module explores how hurricanes connect the ocean-atmosphere-terrestrial systems and society. Students evaluate how hurricane hazards and risks have changed with coastal development. Students also use data to track historic hurricanes and compare the impacts from different hurricanes. The module culminates in a role-playing activity in which students identify and represent stakeholders facing a hypothetical hurricane evacuation in their town. Natural Hazards and Risks: Hurricanes is a great fit for courses in Earth science, environmental science, oceanography, natural hazards, global change, sustainability science, and atmospheric science.

Exploring Geoscience Methods with Secondary Education Students

Developed by Jim Ebert (SUNY-Oneonta), Scott Linneman (Western Washington University), and Jeff Thomas (Central Connecticut State University), this one-to-four week teaching module introduces the distinctive methods of geoscience to future middle and high school science teachers, who may have little experience with the geosciences. In short, the goal is for students to understand how the methods of geoscience are similar to and different from the stereotypical experimental scientific method. By understanding the methods of geoscience, pre-service teachers will be better equipped to develop interdisciplinary lessons that leverage geoscience thinking and content in the teaching of other sciences (biology, chemistry, or physics) or social sciences. Exploring Geoscience Methods with Secondary Education Students is a great fit for courses in Secondary science teaching methods, Earth science education, Elementary science teaching methods, Nature of science or Environmental studies.

Humans' Dependence on Earth's Mineral Resources

Developed by Professor Prajukti Bhattacharyya (University of Wisconsin-Whitewater), Professor Joy Brantlund (Southwestern Illinois College), and Professor Leah Joseph (Ursinus College), this two- to three-week teaching module combines learning about rocks and minerals (and how these become the products students use), methods of mineral resource discovery and extraction, and the impact of mineral resource use. This module allows important geoscience concepts to be taught in the context of important and immediate societal issues while also asking students to confront human issues such as environmental justice, economics, personal choice, and politics that may arise due to obtaining, benefiting, transporting, trading, using, and disposing of natural resources. Humans' Dependence on Earth's Mineral Resources is a great fit for courses in environmental science, geology, meteorology, oceanography, and geological hazards.

Map Your Hazards! – Assessing Hazards, Vulnerability and Risk

Developed by Professor Brittany Brant (Boise State University), Professor Pamela McMullin-Messier (Central Washington University), and Professor Melissa Schlegel (College of Western Idaho), this three-week teaching module provides students an interactive mechanism to engage in place-based exploration of natural hazards, social vulnerability, risk and the factors that shape their communities perception of natural hazards and risk. The module is interdisciplinary in nature as it allows students to integrate interdisciplinary geoscience and social science methodologies to understand societal impacts that result from natural hazards. Students will gain insight into how our knowledge and perspectives of the world shape how we interact with it, and how we promote and build resilient communities through understanding the relationship between human systems (built environment) and natural systems. Map Your Hazards! – Assessing Hazards, Vulnerability and Risk is a great fit for courses in environmental science, Earth science, natural hazards, social problems, global change, and environmental studies.

A Growing Concern: Sustaining Soil Resources through Local Decision Making

Developed by Professor Sarah Fortner (Wittenberg University), Professor Martha Murphy (Santa Rosa Junior College), and Professor Hannah Scherer (Virginia Tech), this two- to three-week teaching module addresses soil sustainability in the context of land management and climate change. Students gain an understanding of the nature and methods of geoscience through building observational skills, using charts to characterize soil samples, and working with geospatial data to understand how humans alter geologic rates of change. Geoscientific habits of mind will grow through working with authentic data and translating scaffolded knowledge into decision-making as students take on the role of agricultural “experts.” The module culminates with a project centered on making sustainable soil management decisions under global climate change. A Growing Concern: Sustaining Soil Resources through Local Decision Making is a great fit for courses in intro geology, intro environmental science, intro soil science, and sustainability courses.

These five new modules join the previously published Climate of Change:

Interactions and Feedbacks between Water, Air and Ice module http://nagt.org/integrate/teaching_materials/climate_change/index.html. All of the InTeGrate-developed teaching materials can be found on the InTeGrate website http://nagt.org/integrate/teaching_materials/modules_courses.html.

Seismic in the Classroom Ahead of the Curve

David Brown, AAPG EXPLORER Correspondent

Jeannette Wolak earned her doctorate in earth sciences at Montana State University, started her career as a deep-water sedimentologist and went to work as a research geologist with Marathon Oil Corp. in Houston.

When she thought back on her college education, what she had learned and what knowledge she lacked, she came up with this perfect response to the university professors who had shaped her studies:

She became a university professor.

Today, Wolak, an AAPG member, is an assistant professor in the Department of Earth Sciences at Tennessee Tech University in Cookeville, Tenn.

“Our class sizes are less than 15 students, so I get to work with students one-on-one,” Wolak said. “I really enjoy working with students. And, I really appreciate my time with Marathon.”

At Marathon, she worked with open-source software for seismic evaluation. The oil and gas industry began experimenting with non-proprietary seismic software packages in part because of their flexibility and adaptability, she said.

Wolak thought the open-source software resource would be a good fit for Tennessee Tech and decided that some experience with seismic was essential for students considering a career in oil and gas.

That decision was influenced by decade-old research conducted by AAPG member Chris Heath, identifying the skills most important to geoscientists in the North American petroleum industry, she noted.

Heath ranked more than 150 skills and capabilities in determining what industry required from employees working in the geosciences. The top three specific knowledge sets were geology, geophysics and computer science.

Wolak knew her students would carry a knowledge gap into the petroleum industry workplace, or even into graduate studies, if they had no experience with geophysics.

“For a university like Tennessee Tech, we don’t offer geophysics. So the students are already at a disadvantage when they graduate,” she said.

Another reason for introducing undergraduate students to seismic was to help them visualize subsurface geology in three dimensions.

“I thought, ‘Let’s bring seismic data. Let’s start using this in the classroom the same way we would the field aspect,’” she said. “You can see things in outcrop. You can see them in the field. Now let’s take it into the subsurface, and use seismic to do that.”

Exposed

Wolak chose software she was familiar with from Marathon, the OpendTect seismic interpretation platform from dGB Earth Sciences in the Netherlands. Last

Brazil: Sergipe Alagoas
New 2D Multi-Client Seismic Data Available

Spectrum has commenced a 11,000 km Multi-Client 2D seismic survey offshore Brazil in the Sergipe and Alagoas Basins along the Eastern Margin of Brazil. The new acquisition program will be key wells in the Basins, including the recent Barra, Murilo, and Farfan discoveries. PreSTM and PreSDM data will be available in Q4 2014.

To supplement the new acquisition in this active exploration area, Spectrum has completed the reprocessing of 8,130 km of data through both PreSTM and PreSDM and is offering this data to industry in order to get a head start on the expected upcoming round in 2015.

+1 281 647 0602
mc-us@spectrumasa.com
www.spectrumasa.com

Spectrum

Photo Credit: Jeannette Wolak

year, the company said more than 2,600 students at 300 universities had used its open-source software.

Universities have free access to OpendTect – a distinct advantage for software used in an academic setting, Wolak said.

In addition to the open-source software platform, dGB offers Open Seismic Repository, a free database of seismic datasets with interpretations.

Using that and other freely available seismic sets, Wolak began introducing her students to 2-D and 3-D seismic interpretation. At one point, she said, the students were surprised to see a curving fault.

“They didn’t realize faults could curve. When you look at faults in the field you don’t necessarily see that curve,” she said.

Wolak found that her students not only enjoyed working with seismic, but also proved to be very adept at writing quick programs and finding online apps to help them with the data.

“The feedback I’m getting from students is very positive. They want to look at more seismic than I can offer them,” she said.

She has no illusions about the depth of learning her students will come away with. Her course is very much an exercise in concept familiarization, introducing ideas like time versus depth.

“It’s very basic,” Wolak said. “These students are not getting a degree in geophysics. But, they are being exposed to seismic.”

A Tech-Savvy World

And, becoming familiar with exploration concepts is an important goal for students in the course. She described it as a practical, résumé-building offering for students who might consider a career in mining or oil and gas.

“Half a semester focuses on mining and exploration, and the other half focuses on the petroleum business,” she said.

The course mostly attracts senior-level students but does include others, and the only requirement is an introductory geology class, Wolak said. The less-experienced students benefit from a strong “camaraderie” in the program, she noted.

“If they haven’t had (a course in) structure and they really don’t know what’s going on with faults, say, there are other students who’ve had structure and can help,” she said.

Wolak finds her students quite able in the physical aspects of geology, in petrology and sedimentation and stratigraphy. The same can’t be said for the numerical aspects of the geosciences.

“Our biggest challenge is developing quantitative skills. Students today are very afraid of math and quantitative challenges,” she observed.

But where the students shine is in computer knowledge and using software tools, and Wolak emphasizes the importance of those skills.

“I tell my students we have a geologist on Mars,” she said.

We don’t talk to that geologist in English or French or Chinese. We talk to it with software, and it responds with streams of data.

Her advice to other geoscience professors:



Photo Credit: Jeannette Wolak

“Embrace today’s technology,” she said. “That’s one of the hardest parts. We (professors) don’t want to keep learning new software, but our students are so adept at it.”

Wolak, who just finished her second year of teaching, still expresses amazement at the software and technology savvy her students bring with them.

“They are so good at software. They write little tools that even I don’t know how they work,” Wolak said. “It’s kind of shocking to see them just go. It makes me wonder where we’ll be in 10 years.”

2015 GSA Student Research Grants

GSA is proud to offer research grants to its highly qualified student members. Students may receive a total of two GSA graduate student grants in their entire academic career, regardless of what program currently enrolled in. The maximum award per grant is US\$2,500.

The GSA student research grant application process is available online only; no paper applications or letters will be accepted. Apply online at www.geosociety.org/grants/gradgrants.htm starting early December 2014. Online submissions must be completed by Monday, 2 February 2015, at 5:00 p.m. MST.

For further information on the 2015 Research Grants Program, go to www.geosociety.org/grants/gradgrants.htm, call +1-303-357-1028, or e-mail awards@geosociety.org

Upcoming Deadline for the Wilson Scholarship in Karst Science

The William L. Wilson Scholarship in Karst Science was established in 2002 to recognize the significant karst science contributions of the late William (Bill) L. Wilson. Bill Wilson used a variety of techniques, and unusual creativity, to tackle some of the most difficult karst science questions in Florida and elsewhere. He developed the leading karst consulting company in the United States, Subsurface Evaluations, Incorporated. To stimulate the development of new, energetic, motivated, and creative karst scientists, and to remember the person of Bill Wilson and his dedication to karst science, the scholarship has been established in his memory. The value of the scholarship as a one-time award is \$1,000.

To apply for the William L. Wilson Scholarship, the following conditions exist:

1) The applicant must be currently enrolled in, or have been accepted into, a masters degree program at an institution of higher education in the United States. PhD students are not eligible.

2) A written proposal of the planned karst study must be submitted. It is limited to 1000 words or less for the narrative, not counting figure captions and references. The research topic should be one concerning karst science, from the field of geochemistry, geology or hydrology. A very simple budget indicating how the funds would be used should also be included (it does not count in the 1000 word limit). Applicants are requested to not recycle master’s thesis proposals as applications.

3) Academic transcripts of undergraduate, and any graduate work, should be submitted. Copies issued to the student by their institution are preferred.

4) Two letters of recommendation, with one of them from the student’s advisor or mentor, should be submitted. These letters should be submitted as e-mails by the letter writers directly to jbmartin@ufl.edu.

5) Applications are due by February 2, 2015, submitted electronically as a single pdf file (application, budget, transcripts, etc.) to

Dr. Jonathan B. Martin jbmartin@ufl.edu

Department of Geological Sciences - University of Florida

Questions regarding the scholarship should be addressed to Dr. Martin. Applicants will be notified in early March of the decision of the Scholarship Committee.

Publications derived from supported research should acknowledge the Karst Waters Institute and the William L. Wilson Scholarship.

For more information, go to: <http://karstwaters.org/scholarship/>

Introductory Student Membership Program

Reprinted with Permission from GS

In early-2013, the GS introduced the Introductory Student Membership program which grants a two-year membership to students from countries that are under represented in the Geochemical Society. To date this program has granted 91 memberships to students in 18 countries. If you are a qualifying student, please consider applying. If expanding the reach and support for geochemistry internationally is important to you, please consider donating to this program. Donations can be directed to this fund either at the time of membership renewal or by completing your member login and clicking the donate link. With your support, we hope to introduce 100 students or more to the field of geochemistry in 2015.

AEG Student Chapter Grants

**Reprinted with Permission from AEG
Velita Cardenas, AEG YPSC Co-Chair**

Each semester, the Student and Young Professional Support Committee (SYPSC) issues two Student Chapter Grants funded by AEG Foundation. One of the fall 2013 recipients, the University of Utah, provided this summary of how they put those funds to use:

"The University of Utah Chapter wanted to provide an experience that was both instructional and fun for all its members. We decided to plan a trip to Utah under the guidance of Bill Lund of the Utah Geological Survey to the Cedar City/St. George area of southern to look at geologic hazards. We knew we didn't have enough



Photo Credit: AEG

money for the trip so we sold beanies and held a fundraiser at Tonyburgers, a local restaurant in downtown Salt Lake. After all that, we still needed funding in order to provide all the necessities, especially vans for transportation. We applied for the AEG Student Chapter Grant and it was awarded to us. Without all the help given to us from AEG and our department, we wouldn't have enjoyed our great weekend learning about a wide range of hazards—from human-induced earth fissures to large-scale landslides. We also looked at soil collapse, rock falls, and the Hurricane fault. Everyone involved had a really good time and a lot of people were impacted in a positive way about their future careers in environmental geology and geoenvironmental engineering. Thank you AEG!"

For more information on how to apply for the Student Chapter Grant, visit the Student Chapter Details page on aegweb.org, or send an email to either of the Student and Young Professional Support Committee Co-chairs: Adair Gallisdorfer at agallisdorfer@yahoo.com or Velita Cardenas at velita.cardenas@gmail.com

\$4.5 Million Investment UK Creates Centre of Doctoral Training

Heather Saucier, AAPG EXPLORER Correspondent

For the first time in a generation, oil and gas doctoral programs in the United Kingdom have received a surge of financial support from the Natural Environmental Research Council (NERC), the main governmental funding body for academic research and training in geosciences in the United Kingdom.



AAPG Member Keith Gerdes, chair of the Centre of Doctoral Training (CDT) Internal Advisory Board. Photo Credit: AAPG

The funding will support a new Centre of Doctoral Training (CDT), which will allow 31 new doctorate students to begin research at 17 different universities this year.

The \$4.5 million investment, which was offered to a consortium led by Heriot-Watt University (HWU) in Edinburgh, Scotland, marks NERC's increased commitment to applied geosciences in hydrocarbon-related fields.

"The NERC Centre for Doctoral Training is a truly game-changing initiative and represents the most exciting development in the provision of training for the energy industry in the UK that has occurred during my career," said AAPG member Keith Gerdes, chair of the CDT's Industrial Advisory Board.

Gerdes, a global exploration adviser at Shell International, also serves as AAPG's European Region president.

The NERC funds will directly support 10 doctorate students, while HWU and its partners will contribute an additional \$9.5 million to enable a total of 93 new doctorate students to begin their work over the next three years.

The HWU group competed against three other university groups for the CDT funding – an effort led by AAPG member John Underhill, chair of exploration geoscience at HWU.

A call for funding from the industry remains open, Gerdes stressed.

"Never before has NERC invested so heavily in this area," said Underhill, who also is a past AAPG Distinguished Lecturer, Matson Award Winner and the 2013 recipient of the AAPG Grover E. Murray Memorial Distinguished Educator Award.

"We look forward to working directly with those in the industry who will place students' interests at heart and serve the best interests and all aspects of the oil and gas research and training in the United Kingdom and beyond," he added.

Primary areas of research will include:

- Effective Production of Unconventional Hydrocarbons.
- Extending the Life of Mature Basins.
- Exploitation in Challenging Environments.
- Environmental Impact and Regulation.

The CDT will include a training academy, funded to date by BP and Shell (funding opportunities remain open). The academy will be geared toward primary areas of oil and gas research so that individual doctorate projects can be properly contextualized to address today's issues of energy demand and environmental responsibility.

Students will have regular access to academic, governmental and industry experts to ultimately produce innovative ideas for the future, Underhill said.

Each year, top students will have a chance to showcase their research and findings to sponsors in the oil and gas industry as part of an annual conference, where they will meet with industry professionals, identify research links and new projects, and possibly pave a path for recruitment, he added.

"The inclusive nature that is at the heart of this collegiate construct is extremely attractive to many members of the industry and will create a 'one stop shop' for industry and academic engagement for both research and recruitment," Gerdes said.

"I am delighted to be involved in such an innovative, student-centric project designed to attract and train top postgraduate talent for the future energy industry."

The HWU group consists of six core partners (the British Geological Survey and the universities of Aberdeen, Durham, Manchester, Oxford and Imperial College) and 12 associate partners (the universities of Birmingham, Cardiff, Dundee, Exeter's Camborne School of Mines, Glasgow, Keele, Newcastle, Nottingham, Royal Holloway,

Southampton and Strathclyde, as well as National Oceanographic Centre).

Details on the CDT can be found at www.pet.hw.ac.uk/research/nerc-cdt-oil-gas-academic-partnership.htm and www.pet.hw.ac.uk/research/nerc-cdt-oil-gas-studentships.htm, or by contacting John.Underhill@pet.hw.ac.uk.

SME Students Participate in K-12 Outreach Contest

Reprinted with Permission from SME
John Hayden, Deputy Executive Director
Public Affairs and Government Relations



Photo Credit: SME

Student chapters of the Society for Mining, Metallurgy & Exploration Inc. (SME) worldwide were challenged to compete with each other to reach the greatest number of K-12 school children in one academic year with the message about the importance of mining and minerals in their everyday lives. Teams of five student members visited local K-12 classrooms to give presentations utilizing Minerals Education Coalition (MEC) resources, including the PowerPoint presentation entitled “The Importance of Minerals and Mining” developed by SME member Dr. Kenneth Reid.

The University of Arizona SME Student Chapter is congratulated for their victory in this first annual student outreach challenge. With guidance from faculty advisor Dr. Mary Poulton and industry advisor Pamela Wilkinson, the team made 26 presentations reaching nearly 900 students. The winning team was presented with a cash

prize and a travel allowance to attend the SME Annual Conference & Expo in Denver, CO, February 2015.

“In addition to providing educators with curriculum that can be incorporated into lesson plans, SME student members bring an energy and enthusiasm into the classroom setting, often bringing their hard hats and clothing worn underground, along with respirators and other personal protection equipment for visual emphasis of their message, ‘If it can’t be grown, it must be mined,’” said SME Executive Director David L. Kanagy.

Participating student chapters each received a starter mineral kit and were encouraged to review the MEC website for additional resources to be used during their presentations. Chapters were also responsible for analysis and reporting the results of questionnaires distributed to the class following their presentations. SME currently has 39 student chapters, including international chapters in Columbia, Chile, Peru, India, Canada, Mexico and the Netherlands.

NCKRI: Adopt-A-Bat

Reprinted with Permission from NCKRI

The Adopt-A-Bat Program will help to raise funds for maintenance and equipment needed for NCKRI’s Bat Roost.

NCKRI is the first building in the world to incorporate a bat roost as part of its design. The roost will be carefully monitored by NCKRI along with a team of bat biologists to better understand the needs of bats in general, of the specific species that will occupy the roost, as well as to produce superior artificial roosts. Bats have visited the NCKRI roost since it was installed in 2009, but ongoing construction has discouraged them from moving in. Now that things are settling down around the new NCKRI building, there is a good chance the bats are going to move in.

With a \$25.00 donation, you can adopt a bat. Your adoption will include: Certificate of Adoption, educational information about the Bat Roost and Bat, and your very own JellyCat “Barty the Bat.” For more information about NCKRI’s Adopt-A-Bat Program, please contact NCKRI’s Advancement Director at 575-628-2702 or by e-mail at info@nckri.org.

Ansel Lundberg Interns at AAG for Fall Semester

Reprinted with permission from AAG

David Coronado, AAG



Photo Credit: AAG

Ansel Lundberg is a fourth-year undergraduate student at the University of California, Santa Barbara working on a B.A. in geography and English. His interests include geographic information systems, urban and transportation geography, and environmental literary criticism and theory. After graduating, he is interested in living and working

in an American city for a few years, and eventually returning to university. He plans to work towards a master's in public administration or to teach high school English. With his degrees, he hopes to incorporate processes of time and place into better managing municipalities and regional governments so that all citizens have fair access to resources no matter their location.

As an intern at the AAG this fall, he will be working on the Association's guide to geography programs and various Eye on Earth projects to better utilize environmental data from national governmental agencies

When he's not at work or studying, he enjoys reading American literature, enjoying craft beer, and backpacking.

Public Lecture: The MAVEN Mission to Mars

Sunday 14 December, 12:00 PM – 1:00 PM

Marriott Marquis Salon 7

AGU's 2014 [Public Lecture](#) will feature scientists working on the [Mars Atmosphere and Volatile Evolution \(MAVEN\)](#) spacecraft. The MAVEN mission was launched in November 2013 and has arrived at and is orbiting Mars! It will continue to orbit the planet and study the top of its atmosphere and how it interacts with sunlight and with the solar wind; the goal is to understand where the

water and CO₂ from an earlier atmosphere went. During the Public Lecture, a panel of experts will discuss how they came to work on the project, the development of the spacecraft, launch, operations at Mars, the mission science concept, science observations made during the cruise to get there, and observations of Comet Siding Spring (which made a close approach to Mars in October 2014).

Exploration Station

Sunday 14 December, 1:00 PM – 5:00 PM

Marriott Marquis Salons 8 & 9

Bring your friends and family and do hands-on science with AGU scientists! [Exploration Station](#), held at the Marriott Marquis on Mission and 4th Street, is a program of activities that gives AGU members who are education/outreach professionals a chance to interact with the public in San Francisco. This event is four hours long, free, and open to the public. Participants make their way through about 30 exhibits offering a variety of easy, family friendly, hands-on activities and have an opportunity to interact one-on-one with scientists, engineers, and education specialists. New this year, Boy and Girl Scouts will be able to complete merit badge requirements.



AMERICAN MUSEUM OF NATURAL HISTORY

MASTER OF ARTS IN TEACHING PROGRAM



Change lives. Teach science.

Learn to teach Earth and Space science with the American Museum of Natural History in New York City!

- Apply for a FULLY PAID fellowship in a program that prepares you to teach Earth science in middle and high schools in New York City and New York State.
- Learn to teach in museum and school settings with the support of teacher education faculty and experienced residency school mentors.
- Benefit from the Museum's world-class collections and laboratories as you study and conduct research with renowned scientists.
- Share your passion for science and learning by teaching in high-needs schools after graduation with continued professional and financial support.

The Master of Arts in Teaching Urban Residency Program at the American Museum of Natural History in New York City invites you to change lives and make a difference by teaching science! We are seeking students from diverse life and career experiences, including recent college graduates, veterans, volunteer corp participants, and career changers. Apply now online to start your new life inspiring the next generation of scientists.

Join us for an informational webinar or open house at the Museum! Details at amnh.org/mat

With deepest appreciation, the Museum acknowledges Kathryn W. Davis for her generous founding support.



The MAT program is also supported by the New York State Education Department and by the National Science Foundation under Grant numbers DRL-1119444 and DUE-1340006.

Additional support has been provided by the Booth Ferris Foundation.

amnh.org/mat

mat@amnh.org | (212) 313-7464 | [@amnh](https://twitter.com/amnh) | facebook.com/amnhmat

NOW YOU CAN HAVE YOUR **EARTH**
ANYWHERE ON THE PLANET



EARTH Magazine is now available digitally for a Kindle, e-reader or as a PDF! For just \$20, you can have EARTH's informative content anywhere each and every month.

Go to www.earthmagazine.org to subscribe. Twenty dollars has never gone this far!

Image ©Shutterstock.com/Sergey Nivens

The Geoscience Community behind the First Fully-Accessible GSA Field Trip

Dr. Chris Atchison, IAGD
Heather Houlton, AGI

On Saturday, October 18, thirty-five geoscience faculty and students from across the US, Canada, the UK and New Zealand came together to participate in the first fully accessible geology field trip offered at the Geological Society of America annual meeting. Led by Dr. Chris Atchison from the University of Cincinnati and Brett Gilley from the University of British Columbia, the trip was conducted with assistance from the International Association for Geoscience Diversity (IAGD) and supported by the National Science Foundation (NSF) and the Society for Exploration Geophysicists (SEG).

While in the field, participants visited six prominent locations between downtown Vancouver and Whistler, British Columbia. Each of these stops provided aspects of the geologic history of the region representing both glacial and volcanic processes that, over time, have created both beautifully dramatic landscapes and the potential for severe natural hazards. However, these locations offered a unique opportunity for students with various disabilities to participate in geologic field study through multi-sensory observation.

During the trip, student and faculty participated in a study being conducted by researchers at the University of Cincinnati, Central Michigan University, and the University of Plymouth in the UK. The purpose of this study was to understand the interaction between faculty and students during an inclusive field-based learning experience, designed to accommodate both physical and cognitive disabilities. For a more detailed trip itinerary and pictures, there is a forthcoming article in [EARTH Magazine](#).

This trip was conducted just weeks after AGI's most recent Leadership Forum on September 15th titled, "Accommodating Geoscience Workforce Diversity: Including the Talents of All Geoscientists." The event, which was held in Washington D.C., brought the leadership of AGI's membership societies together to discuss the challenges of access and inclusion in the geosciences. An interactive icebreaker activity introduced

participants to new perspectives regarding access and inclusion, and illuminated existing biases, which set the stage to continue conducting open discussions regarding these issues throughout the Forum.

Dr. Chris Atchison, the Executive Director of the International Association for Geoscience Diversity (IAGD) who co-facilitated the event, painted an austere picture of U.S. society's perceptions of individuals living with disabilities coupled with a contrasting dedication emphasizing the unique abilities that these folks do bring to the table. He demonstrated the acute need for promoting access and inclusion of geoscientists of all abilities in our community programs, events, field experiences, research and careers.

As much as the Forum is designed to create a safe space to discuss pressing issues, it also provides an opportunity for AGI and its member societies' leadership to develop and equip the community with the tools and resources to tackle these important challenges. To provide information about the legal challenges organizations may face when accommodating geoscientists with disabilities, AGI invited an attorney who specializes in human resources issues, including access and inclusion, for non-profits. He provided legal advice and served as an immediate resource for participants to ask questions, as well as offered his assistance to those who might have questions after the event.

Complimentary to the legal resources provided by the first speaker, AGI invited a prominent individual from AAAS who shared her professional and personal experiences regarding diversity, and specifically, regarding access and inclusion in STEM disciplines. Connected by robust discussion between sessions, AGI's last speaker shared his very personal anecdote about his colleague who is a geoscientist living with a severe disability and how his organization accommodated the individual.

To wrap up the Forum, a group discussion was facilitated which focused on how to build awareness of the need for inclusion in both workforce development and in the workplace. Additionally, the group agreed that a community-wide statement regarding the need for improving access and inclusion in the geosciences was needed. AGI, along with the IAGD and the Geological Society of London (GSL) are currently leading the effort to write this statement and disseminate it broadly to

the geoscience community. This must be a community-designed and implemented statement. If your organization is interested in participating, please feel free to contact Heather Houlton, at AGI hrh@agiweb.org, or Chris Atchison with the IAGD christopher.atchison@uc.edu.

A video of the GSA Field Trip #416, produced by GSA, is available [here](#).

Dr. Yonette Thomas to Assume Key Leadership Roles at the AAG

Reprinted with Permission from AAG

David Coronado, AAG



Photo Credit: AAG

The Association of American Geographers (AAG) is pleased to welcome our distinguished colleague, Dr. Yonette Thomas to our staff. Dr. Thomas was formerly Associate Vice-President for Research Compliance at Howard University. She has also served in leading positions at the National Institutes of Health (NIH) for many years,

including most recently as Branch Chief of Epidemiology Research, in the Division of Epidemiology, Services, and Prevention Research at the National Institute on Drug Abuse (NIH-NIDA).

In the position of Senior Advisor to the AAG, Dr. Thomas will help lead AAG's growing portfolio of research programs in health and geography. Working closely with the executive director, she also will provide strong expertise and leadership to the AAG's multiple initiatives on gender, race, ethnicity, sexual orientation, disabilities, and other diversity and equity programs at the AAG.

At Howard University, Dr. Thomas established the new Office of Regulatory Research Compliance; reengineered the human subjects protection and responsible conduct of research programs; introduced compliance procedures consistent with regulatory requirements and academic best practices; recruited academic leaders to Institutional Review Boards to build credibility and fidelity; and led outreach and collaboration with academic deans and researchers.

At NIH-NIDA she developed and advanced a portfolio of science focused on the social determinants of drug use and health. Her work focused on the social epidemiology and etiology of drug abuse and HIV and related health risks. She led a major reformulation of the epidemiology research program at the National Institute on Drug Abuse.

Yonette Thomas has long served on many key national research and education committees, including National Academies of Science (NAS) committees, NIH committees, and University committees. She currently is a member of the Steering Committee of the National Hispanic Science Network and the Board of Directors of the Consortium of Social Science Associations, among others. Her research and publications have focused on the social epidemiology of drug abuse and HIV/AIDS and the link with geography. Of particular note is the volume, *Geography and Drug Addiction*, Springer, 2008, which she co-edited with Douglas Richardson. She has served on the faculty in the Department of Public Health Sciences at the University of Miami Miller School of Medicine where she taught social epidemiology of drug abuse. She holds a Ph.D. in medical sociology and demography from Howard University.

Geological Society signs Declaration on Diversity, Equality and Inclusion

Sarah Day, Geological Society of London Writer

The Geological Society has today made a commitment to improving diversity within the geosciences by signing the Science Council's Declaration on Diversity, Equality and Inclusion.

The Declaration on Diversity, Equality and Inclusion brings together the Geological Society with other learned and professional bodies from across the sciences to work towards increased diversity and inclusion in science education and careers. The Declaration states that:

"By promoting equality, diversity and inclusion the Science Council and its member bodies will create greater opportunity for any individual to fulfil their scientific potential, irrespective of their background or circumstances. In so doing it will also help science to



GSL Executive Secretary Edmund Nickless and Council member Natalyn Ala signing the declaration. Photo Credit: GSL

better serve society by attracting the widest possible talent to the science workforce and fostering a greater diversity of scientific ideas, research and technology.”

Global health needs, an ageing population, food and water security and achieving low carbon economies are all driving up demand for STEM (Science, Technology, Engineering and Mathematics) skills. Despite this, there is an estimated annual shortfall in domestic supply of around 40,000 new STEM skilled workers². Improving diversity at all levels of the science workforce is key to meeting this challenge.

It remains the case that women, disabled people, those from ethnic minorities and from socially disadvantaged groups are consistently underrepresented in STEM, particularly at senior levels². Black and minority ethnic (BME) men are 28% less likely to work in STEM than their white counterparts², disabled students 57% less likely to take up postgraduate STEM study than non-disabled students², and there is a gap of 26% between women and men in science, engineering and technology employment³.

“The influence and potential leadership of professional bodies means they are critical effectors of change within the science community,” said Tom Blundell, President of the Science Council. “By signing the Declaration they are showing that they will use that influence to ensure the science workforce is open to everyone.”

To read the Science Council Declaration on Diversity, Equality and Inclusion in full and find out more about this

initiative, go to <http://www.sciencecouncil.org/content/diversity-equality-and-inclusion>

References

- Current and Future UK science workforce, Science Council, 2011
- Improving Diversity in STEM, CaSE, 2014
- Women and men in science, engineering and technology: the UK statistics guide 2010, UKRC, 2010

Toward a More Healthy Discipline

Reprinted with Permission from AAG
Mona Domosh, AAG President

If one googles the word ‘stigma’ the definition that appears first on your screen (“a mark of disgrace associated with a particular circumstance, quality, or person”) is followed, as most definitions are, by a phrase showing how that word is commonly used; in this case the phrase that google uses is “the stigma of mental disorder.” I know that I shouldn’t be surprised by this, particularly given the recent publicity about Robin Williams and his secret battles with depression, but I was. I had assumed (obviously incorrectly) that in popular parlance a mental disorder was no longer considered a character flaw or mark of disgrace, but rather an illness that afflicts certain people and families and that is treated (like any illness) therapeutically. I have had several bouts of depression that have left me drained and feeling vulnerable, and anxiety is something I’ve come to live with but only after years of therapy and different forms of treatment. I haven’t felt ashamed of this, but then again I don’t make a habit of talking about my illness or mental health in general. But prompted by some wonderful colleagues who are proposing a new AAG committee on mental health in the discipline, that’s exactly what I want to do in this column.

For many of us October represents the midpoint of fall term when one can literally feel the anxiety level within our classrooms and hallways begin to rise. According to the American College Health Association’s 2013 survey[i], over 51% of undergraduate students felt overwhelming anxiety during the past twelve months, and almost 32 % felt so depressed that it was difficult to

stig·ma

/ˈstigmə/

noun

a mark of disgrace associated with a particular circumstance, quality, or person.

"the stigma of mental disorder"

synonyms: shame, disgrace, dishonor, ignominy, opprobrium, humiliation, (bad) reputation

Definition of Stigma, Google search result for this essay. Photo Credit: AAG

function (with a notable gender difference; in both cases higher numbers for women). Eight percent had seriously considered suicide. In the U.K., a study undertaken by the National Union of Students showed that one in five students reported that they had a mental health illness (<http://www.theguardian.com/education/2014/mar/31/mind-taboo-mental-health-university>). And in geography we often encounter the additional challenge of requiring fieldwork for many of our courses and research, creating situations that may exacerbate mental health conditions.[ii] It's a stark reality we face, and few of us know how to manage it. Academic leaders in Canada are ahead of the curve. Some Canadian universities are considering ways to reduce anxiety during peak, end-of-term periods by reworking exam schedules while others are training student leaders in mental health awareness in order to reach out to their peers (<http://www.theglobeandmail.com/news/national/as-student-stress-hits-crisis-levels-universities-look-to-ease-pressure/article5902668/>). But for most faculty members, awareness of our students' mental health comes in bits and pieces; notes from a disability office/health clinic, overheard anecdotes, or the student who is willing to share their illness. The big picture – the scope of the problem that has been referred to in some circles as having reached crisis proportions – has certainly eluded me and I suspect many faculty, with the effect that discussions about how to handle the situation are muted if at all present.

And it's not just undergraduate students who are experiencing high levels of anxiety and depression (and other

mental disorders). I highlighted in my column last month (<http://news.aag.org/2014/09/recognizing-the-work-of-graduate-students/>) the important work that graduate students do for our discipline and academic institutions, noting that they often conduct this labor in conditions that are not of their own choosing and certainly not well remunerated. Those conditions in addition to the uncertainties graduate students face in the academic job market create highly stressful situations that can often lead to anxiety disorders, depression and in rare instances suicidal behavior. Recent online news media have brought these issues to the fore (<http://www.theguardian.com/higher-education-network/blog/2014/mar/01/mental-health-issue-phd-research-university>; <https://www.insidehighered.com/blogs/gradhacker/mental-health-issues-among-graduate-students>), offering suggestions about how graduate programs can offer support for students' mental health issues that range from openly acknowledging the problem to providing training for faculty teaching in these programs about how to recognize and address mental health issues.

In my case, it was only after I left graduate school that my mental health became a concern. Unmoored from the networks of friends and colleagues from graduate school and living through the constant insecurities of one-year positions, my taken-for-granted coping strategies disintegrated and eventually disappeared, leaving me in a very dark world of despair. It literally was a struggle each day to make it through my classes and meetings without breaking down into tears, while at home I found it impossible to sleep (thus further deteriorating

my mental health). I of course told no one, exacerbating my feelings of loneliness and estrangement and plunging me deeper into depression. Apparently my story is a fairly common one; a recent study has documented some of the factors that can lead to anxiety disorders and depression among contingent faculty, with the stress of non-permanent positions ranking high (<http://journal.frontiersin.org/Journal/10.3389/fpsyg.2014.00701/full>). The authors look to institutional change in order to combat some of these concerns, particularly since their findings suggest that it is the contingent faculty who are the most committed to their institution who suffer the most negative consequences in terms of feelings of anxiety and depression.

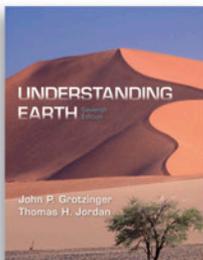
I wonder, however, what we as an association and discipline can do to help. I finally recovered from depression by reaching out to some very good friends who encouraged me to find professional treatment. But I know that if I had been able to talk about what was happening with my colleagues without feeling shame that I would have recovered much sooner. I also realize that if I had received training about how to recognize and deal with clinical depression and anxiety disorders I would have (hopefully) recognized those symptoms in myself and been more equipped to handle them. This (among other things) is exactly what the proposed new AAG committee will take on as its mission. Spearheaded by Beverley Mullings, Kate Parizeau, and Linda Peake, a group of geographers organized a series of sessions at last year's AAG meeting on mental health issues, established a listserv (MHGEOG-L [at] lists [dot] queensu [dot] ca), and are now proposing to establish a standing committee of the AAG. The proposed Committee on the Status of Mental Health in Geography will conduct research into the scope of the problem and assess the policies of other organization and institutions, provide professional guidance to the Council, the AAG, and geography departments in terms of protocols and ethical issues related to mental health, and engage in advocacy and awareness-raising within the AAG and academic institutions. I think this is a very important and long-overdue step that we need to take. The word "stigma" should not be a presumed outcome of "mental disorder." I welcome your thoughts.

[i] See American College Health Association, American College Health Association-National College Health Assessment II: Reference Group Undergraduates Executive Summary Spring 2013, Hanover, MD: American College Health Association, 2013.

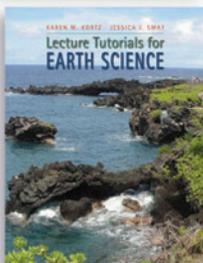
[ii] See Jacky Birnie and Annie Grant, Providing Learning Support for Students with Mental Health Difficulties Undertaking Fieldwork and Related Activities, Gloucestershire, U.K.: Geography Discipline Network and Geography and Environmental Research Unit, University of Gloucestershire, 2001. AGI/AIPG Summer Interns Learning the Ropes in Washington, DC.

W.H. FREEMAN AND COMPANY NEW FOR 2014

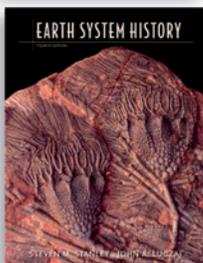
G E O L O G Y



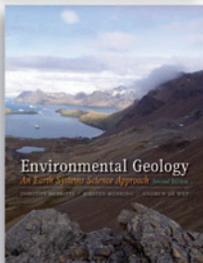
Grotzinger | Jordan
**UNDERSTANDING
EARTH**
Seventh Edition



Kortz | Smay
**LECTURE
TUTORIALS FOR
EARTH SCIENCE**



Stanley | Luczaj
**EARTH SYSTEM
HISTORY**
Fourth Edition



Merritts |
Menking | de Wet
**ENVIRONMENTAL
GEOLOGY**
Second Edition

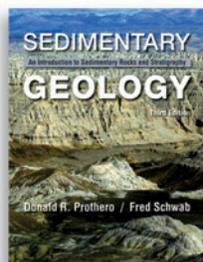


Bierman |
Montgomery
**KEY CONCEPTS IN
GEOMORPHOLOGY**

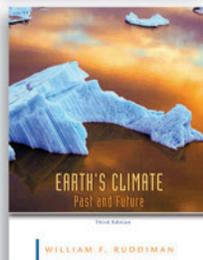


W. H. Freeman's acclaimed media content in a breakthrough interface in which power and simplicity go hand in hand. Featuring:

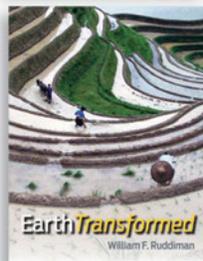
- Prebuilt Units
- LearningCurve adaptive quizzing
- Videos and tutorials
- Helpful analytics
- Interactive e-Book
- GoogleEarth® exercises



Prothero | Schwab
**SEDIMENTARY
GEOLOGY**
An Introduction to
Sedimentary Rocks
and Stratigraphy
Third Edition



Ruddiman
**EARTH'S CLIMATE
PAST AND FUTURE**
Third Edition



Ruddiman
**EARTH
TRANSFORMED**

For more about our outstanding textbooks and educational media across the geology curriculum, contact your local W.H. Freeman representative, or visit www.whfreeman.com/geology



Visit Our Website
Purchase with Only a P.O. #
No Credit Card Needed!



Did You Know...

Enviro-Tech Rental Program

If Requested
Calibration Kit,
Video & CD,
Tool Kit

Instruction Manual
and Rental Agreement

**It looks Sharp
and Professional**

Instrument is
Charged & includes
Charger

All Accessories
as needed

**Our Quality Guarantee—
If we fail to provide any
of this, your rental is
FREE* until we fix it.**

*The only condition is you need to
notify us immediately.

Clean Foam
Packaging

Working Instrument &
Certificate of Calibration

We Rent Instruments

Visit www.envirotechonline.com ◆ Call Toll Free **1-800-468-8921**

EnviroTech's Quality Guarantee on Rentals

- If we fail to provide any accessory equipment as ordered, your rental is free
- If any rental doesn't work, your rental is free



Solinst 101
Water Level Meter

RENTAL RATES
25/60/200
DAY WEEK MONTH
Also a Certified
Repair Facility



RAE Systems
MiniRAE 2000 PID

RENTAL RATES
75/200/725
DAY WEEK MONTH
Also a Certified
Repair Facility



AMS Basic Soil Sampling Kit

RENTAL RATES
75/200/600
DAY WEEK MONTH
Also a Certified
Repair Facility



Geotech
Low Flow Sample System

RENTAL RATES
w/Controller
165/495/1485
DAY WEEK MONTH
Also a Certified
Repair Facility



Solinst Levellogger

RENTAL RATES
60/180/560
DAY WEEK MONTH
Also a Certified
Repair Facility



YSI 556
System

RENTAL RATES
75/210/600
DAY WEEK MONTH
Also a Certified
Repair Facility

We accept PO's ◆ Call Toll Free **1-800-468-8921**

AGI Fellow Gets a Peek at Cutting-Edge Research at Schlumberger-Doll Research Center

**Stephanie Tubman, AGI/Schlumberger Fellow
AGI Center for Critical Issues**



The AGI team tours the Schlumberger-Doll Research Center in Cambridge, MA. From left to right: 2014 AGI/Schlumberger Fellow Stephanie Tubman; Policy Associate Meg Gilley; Geoscience Policy Director Maeve Boland. Photo Credit: Stephanie Tubman

In September, I got a firsthand look at Schlumberger's competitive research program in subsurface measurement, touring the Schlumberger-Doll Research Center in Cambridge, MA, with Geoscience Policy Director Maeve Boland and Policy Associate Meg Gilley. Schlumberger is an oilfield services company that supplies technology, project management tools, and software and information tools to oil and gas companies. Schlumberger has always placed significant emphasis on research in order to stay on the cutting edge of science and technology, helping their clients to find and evaluate oil and gas reservoirs, extract resources as safely and cost-effectively as possible, and maximize yields.

Schlumberger-Doll was the first Schlumberger research facility, founded in Ridgefield, CT, in 1948. The facility moved to Cambridge in 2006 to take advantage of Cambridge's position as a major science and technology hub. It is one of six Schlumberger research facilities around the world. The Schlumberger-Doll facility focuses principally on research on subsurface measurements

and has five research divisions: sensor physics, focused on the experimental and theoretical development of hardware for subsurface measurement; mathematics and modeling, focused on the processing and inversion of subsurface data; reservoir geosciences, focused on using subsurface data to assess oil and gas resources; mechanics and materials science for oil and gas applications; and CO₂ mitigation and sequestration, focused on the science and technology of subsurface injection of CO₂, including wellsite selection, monitoring, geomechanics, and thermodynamics.

We received an overview of Schlumberger's history and operations, heard about their sensor physics lab's research, and toured the sensor physics lab. Lab director Daniel Codazzi explained that they pioneer technologies that do for borehole conditions what common medical sensors, like MRIs or X-ray machines, do for the human body. The sensors measure a range of conditions down the borehole, such as fluid composition and rock mechanics. Borehole sensor development provides unique challenges: downhole conditions are extreme, sensors must conform to the narrow dimensions of a borehole, and sensors can only look at the rock from inside out, contrary to a medical sensor that scans a patient from outside in.

Part of Schlumberger's success in research and field operations comes from their commitment to intellectual diversity. They draw on international talent and employ local citizens wherever they operate, employing around 126,000 people representing 140 nationalities in 85 countries. We gave a presentation on AGI's work to the lab team and had lunch with the facility's fellow and five research division directors, who were enthusiastically interested in AGI's public outreach and the role of geoscientists in society. Although the visit was short, we enjoyed this energizing peek into the competitive research culture of such a high-performing company.

Stephanie Tubman is the 2014 AGI/Schlumberger Fellow in Geoscience Communication, a competitive 6- to 12-month appointment based out of AGI headquarters in Alexandria, VA. She will complete her fellowship this December.

Newman Joins AAPG's D.C. Office



Photo Credit: AAPG

Colleen Newman recently was named policy communications advisor for AAPG's Geoscience and Energy Policy Office in Washington, D.C.

She'll join office director Edith Allison there in efforts to expand AAPG's outreach efforts with policymakers, likeminded industry groups and the media.

Newman has been engaged in energy policy issues in Washington D.C., for more than 20 years, serving for four years as a federal affairs liaison and energy policy adviser to Puerto Rico Governor Luis Fortuño.

She also served in a similar capacity to the governor in his role as Puerto Rico's sole congressman and as his adviser on issues before the House Natural Resources Committee, including offshore oil and gas development.

Newman also has worked for the American Fuel and Petrochemical Manufacturers (formerly the National Petroleum Refiners Association) and the law firm of Brickfield, Burchette, Ritts and Stone, PC.

She can be reached via email atcnewman@aapg.org.

GSA Welcomes Congressional Science Fellow

**Reprinted with Permission from GSA
Casey White, GSA**



Photo Credit: GSA

Susanna Whitman Blair serves as the 2014-2015 GSA-USGS Congressional Science Fellow. Blair has extensive training in geological sciences, teaching, and science consulting. She received a B.A. in geology at Colgate University in Hamilton, NY in 2003. Her research investigated the eruption histories of Wolf and Darwin Islands in the Galapagos Island chain. In

2006, Blair completed her M.S. from the University of Florida in geology, where she investigated the use Neodymium isotopes extracted from the iron-manganese oxide coatings of ocean sediments as a method to track ancient ocean circulation. After graduation she worked for an international environmental consulting firm in Jacksonville, FL conducting Phase I and II environmental assessments.

Blair earned her Ph.D. in geology from the University of Florida in the spring of 2014. Her research investigated the accumulation of trace metals in northern Florida lake sediments and the effects of drought induced lake level low-stands on the distribution of these metals in sediments. Her research has implications in light of climate change projections and potential human and ecosystem health concerns associated with metal pollution. During her tenure as a student, she held a NSF IGERT (Integrative Graduate Education and Research Traineeship) Fellowship focused on the adaptive management of water, wetlands, and watersheds. She also was awarded a NSF funded SPICE (Science Partnerships in Collaborative Education) under which she co-taught physical science in a public middle school for two years. Additionally, she worked extensively with environmental law students and lawyers as a science consultant on a number of inland and coastal water projects throughout Florida. The Congressional fellowship brings together the interdisciplinary background of her career so far: scientific research, policy issues affecting local communities and the environment, teaching and communicating science to diverse audiences, and engaging with the public science education. She is passionately committed to science literacy and looks forward to continuing this work.

Blair notes she is humbled and honored to serve as the 2014-2015 GSA-USGS Congressional Science Fellow. She is eager to use her science communication skills to engage a range of audiences. Her goal is to contribute a credible and pertinent voice for science and science education policy during the upcoming fellowship year.

Deborah Weiser Represents SSA at 7th Annual Geosciences Congressional Visits Day

Reprinted with Permission from SSA



Photo Credit: SSA

Deborah Weiser of UCLA, recipient of this year's Geo-CVD Student Travel Grant, represented SSA at the annual Geosciences Congressional Visits Day (GEO-CVD), September 16–17, in Washington D.C. Debbie participated in seven meetings on Capitol Hill, including Senator Patty Murray's constituent coffee and meetings with key staff in three Congressional offices (Representatives Rohrabacher, Bass, & Speier) and four Senate offices (Senators Boxer, Feinstein, Murray and Cantwell). Her report on her experience will appear in a future issue of SRL.

Geo-CVD '14 was a great success, with over 100 individual Hill meetings scheduled for the 40+ participants this year. The overarching message for Geo-CVD is the importance of continued federal investment in geoscience research and development, and Debbie was also able to address her fields of interest in induced seismicity in California geothermal fields, earthquake early warning and earthquake preparedness education and outreach. The two-day event started with an informational session on the workings of Congress, the current budget situation, what to expect during the lame duck session after the election, and conversations with current Congressional staff on the "wows and woes" of working in Congress. The session allowed for the participants to interact with one another, practice their presentations for the Hill meetings to follow, and interact with government relations staff from the organizing societies to answer questions and provide helpful hints.

Geo-CVD '14 was a great success, with over 100 individual Hill meetings scheduled for the 40+ participants this year. The overarching message for Geo-CVD is the importance of continued federal investment in geoscience research and development, and Debbie was also able to address her fields of interest in induced seismicity in California geothermal fields, earthquake early warning and earthquake preparedness education and outreach. The two-day event started with an informational session on the workings of Congress, the current budget situation, what to expect during the lame duck session after the election, and conversations with current Congressional staff on the "wows and woes" of working in Congress. The session allowed for the participants to interact with one another, practice their presentations for the Hill meetings to follow, and interact with government relations staff from the organizing societies to answer questions and provide helpful hints.

Controversy in Colorado - Task Force Appointed in Lieu of Vote

Heather Saucier, AAPG EXPLORER Correspondent
It was a collective sigh of relief heard 'round the state.

Two months ago, Colorado Gov. John W. Hickenlooper managed to pull off what many call the compromise of the season – the political season, that is – in a state that has been dragged into a months-long, messy battle between the oil and gas industry and politicians and activists who oppose drilling on various levels.

On Aug. 4, Hickenlooper agreed to a deal that kicked two anti-hydraulic fracturing initiatives off the November ballot in exchange for the creation of a task force that would work to find ways for "responsible energy development," as stated by Colorado media.

Had both initiatives remained on the ballot, the public would have been responsible for ultimately deciding the future of the energy industry in the state, which in 2012 realized \$30 billion in economic activity and \$1.6 billion in public revenue as well as the creation of 111,000 jobs, according to the Colorado Petroleum Association.

This would have been the first statewide vote in the country on whether or not to tighten rules on energy development.

"To leave this up to the ballot and for citizens to vote on it – that was promising to be the most contentious fall we would have had in Colorado," said AAPG Honorary member Steve Sonnenberg, past AAPG president and professor and Charles Boettcher Distinguished Chair in petroleum geology at the Colorado School of Mines.

His position: The average person should not have to sift through highly technical information to make decisions that affect millions of dollars in investments and the state's energy security and financial solvency.

"The biggest accomplishment is the governor getting both sides to the table and getting them to be willing to compromise," he said. "It's a big deal."

"I think everyone is feeling pretty good about it," he continued. "It's a huge step forward, and I think the people who are coming to the table need to be commended for their willingness to assess issues and their undoubted ability to compromise on these issues."

Two chairs and 19 members of the task force were appointed in September, representing local governments and environmentalists, civic and business leaders, and industry representatives are currently being selected.

Two are AAPG members: Peter Dea of Cirque Resources and Dan Kelly of Noble Energy – both based in Denver.

Looking For Answers

Many are looking to this body to resolve a host of issues that have been the source of constant contention in the state, said Doug Flanders, director of Policy and External Affairs for Colorado Oil and Gas Association (COGA).

Prior to the compromise between Hickenlooper, a former AAPG member, and his major opponent, U.S. Rep. Jared Polis – who backed both ballot initiatives – concerns over setbacks, pollution, traffic, land reclamation and permitting filled the mountain air and practically every Coloradoan's television screen on a daily basis.

The pulled initiatives aimed to increase setbacks from 500 feet to 2,000 feet, as well as give local communities the majority of control over drilling for the first time in history.

Ironically, industry and local communities have been addressing such concerns for quite some time. Noble recently worked with the Environmental Defense Fund, Anadarko Petroleum Corporation and EnCana Corporation to develop language for some of the most stringent air rules regulating hydrocarbon emissions in the country.

"We want to keep methane in the pipe and out of the air," said Ted Brown, Noble's senior vice president. "It is the right thing to do."

Noble also is systematically developing its acreage in the DJ Basin to reduce impacts through integrated development plans (IDPs) that cover an area of roughly 100 square miles. Each IDP is developed with a comprehensive design for infrastructure to reduce truck traffic by installing a full network of pipelines to move oil, natural gas and water.

"This long-range planning enables us to sit down with local communities and stakeholders to talk to them about our development plans early in the process," Brown added. "The use of our first IDP in the DJ Basin,

incorporating horizontal drilling, pipelines and a central processing facility, makes it possible to reduce the need for tanks on location – saving 626,000 tons of carbon dioxide emissions from trucks, which is equivalent to 66,000 SUVs taken off the road for 10 years."

Furthermore, Noble and Anadarko created Coloradans for Responsible Energy Development (CRED) in 2013 to explain in simple terms all that industry has done to "go the extra mile" to address community concerns, especially regarding the heart of the state's energy debate: hydraulic fracturing.

"Fracking (sic) has been safely used over 1.2 million times since 1947," the CRED.org website states. "Today more than 90 percent of oil and gas wells undergo fracking at some point during their lifespan, and neither the Environmental Protection Agency (EPA) nor the Colorado Oil and Gas Conservation Commission (COGCC) have ever found a connection to chemicals entering our groundwater as a result of the fracking process."

The task force has its job cut out for itself, Flanders said.

"At the end of the day, we have to identify the problem we are trying to address," he said. "What's the question? What's the issue? What's the problem?"

"Once this process gets started," he added, "a lot of people will realize the questions they have already have answers."

Common Ground

In Colorado, a robust engagement process that includes a "local government designee" has been very successful at bridging gaps between industry operations and concerns at the local level, Flanders said.

He added that many on the task force soon may learn that many avenues to compromise are already in place and simply haven't been used because people don't know they exist.

Even after Colorado cities such as Longmont, Fort Collins and Broomfield worked with the industry to successfully develop Memorandums of Understanding (MOUs) as forms of compromise at the local level, some activists in Longmont and Fort Collins, later put bans on the ballot to ban drilling altogether, Flanders said, hinting that concerns about hydraulic fracturing might really be a facade.

“Is this really about regulatory issues that government is able to address,” he asked, “or is this really about banning oil and gas?”

In the last month, two Colorado district courts have found in August that local bans on hydraulic fracturing violate state law. In an act of good faith, Hickenlooper chose to withdraw a 2012 state suit against Longmont for banning hydraulic fracturing as part of the over compromise.

It is reported that the task force will be able to make recommendations based on a two-thirds majority vote. One of the issues surely to be discussed are setbacks. While some might believe that increasing setbacks to 2,000 feet will ease landowners’ fears about wells drilled too close to their homes, an increase in setbacks can actually stir up additional controversy, Flanders explained.

A landowner who approves a well on his or her property may find that well is within 2,000 feet of a neighbor’s home. If the neighbor doesn’t approve the siting of that well, he or she could prevent the landowner from approving the well.

“It’s like your neighbor across the street telling you that you can’t park in your own garage,” Flanders said. “The further the setback, the more neighbor-to-neighbor conflict you create. The landowner can say ‘yes’ to the well, the mineral owner can say ‘yes,’ and the third party with no interest in the well or the mineral rights is telling the two private property owners that they can’t access their property.”

Such predicaments will be placed in the hands of the task force.

However, rather than worry about the nitty-gritty at this point, most are simply breathing more easily that all sides are willing to work to find a compromise.

“We are happy the initiatives are off the table now,” Flanders said. “We are not having to argue on the edges. When you make a technical issue political by putting it in the constitution, the argument doesn’t go to a compromise. You have to argue in five-second, 10-second and 20-second sound bites – so now we can have a real conversation.

“We are hoping the members on the task force will approach it in a way of conversation, discussion and understanding rather than fighting and disagreement

and angry discourse,” he said. “If it’s the latter, it will be difficult to find common ground.”

AGI/AIPG Summer Interns Learning the Ropes in Washington, DC

**Reprinted with Permission from AIPG
Introduction by Abigail Seadler, AGI**

Each summer the American Geosciences Institute (AGI) hosts three interns within the Geoscience Policy Program to teach them about the connection between geoscience, society, and public policy. As a part of their internship experience, the interns attend congressional hearings on Capitol Hill, coalition meetings, and field trips to federal agencies such as the U.S. Geological Survey and NASA. Over the course of their 12-week internships, Eliana Perlmutter, Zachary Schagrin, and Lily Strelch have evolved into not only stellar geoscience students, but also certified policy wonks.

Eliana Perlmutter is a Geosciences major and Engineering minor at Smith College where she also focuses her studies on American Government. At Smith, she studies microfossils from after the Snowball Earth global glaciations in the Neoproterozoic Era. Her other research interests include bridging geology and technology by learning more about the applications of lidar. She previously interned with the National Oceanic and Atmospheric Administration investigating dolphin health in the coastal waters of Charleston, SC. A member of the Sigma Xi scientific research society and a 2011 winner of the FIRST Robotics World Championship, Eliana loves to share her passion for science with students through STEM outreach. Eliana is a circus arts enthusiast who comes to AGI from Stow, Massachusetts.

Zachary Schagrin, SA-4537, is currently working towards a Master’s degree in Geosciences at West Chester University of Pennsylvania. His research focuses on developing a chemostratigraphy of the Marcellus Shale in Pennsylvania, using radiation as a proxy for natural gas levels. Some of his other research interests include ultramafic petrology and serpentine soils. Zachary also completed his undergraduate degree at West Chester University, earning a Bachelor’s in Political Science with a concentration in Public Policy and a minor in

Geology. Here, he examined the use of the filibuster in the United States Senate. He is originally from Levittown, Pennsylvania.

Lily Strellich is a Geoscience Policy Intern with the American Geosciences Institute. She graduated in May 2014 with a Bachelor's degree in Geology from Occidental College. As an undergraduate, she volunteered with the National Institute of Archaeology in Bulgaria, and studied environmental policy in Berlin. She earned academic distinction for her senior thesis, written on exhumation and uplift in the Sierra Nevada Mountains, where she attended field camp. Lily's research interests include oceanography, hazard mitigation, unconventional resources, and Arctic geopolitics. She plans to continue promoting the geosciences as a science writer. She is originally from Santa Barbara, California.

Linking Landslides and Lidar

By **Eliana Perlmutter**

Landslides come in many varieties. Some creep along inch-by-inch, others cause rocks to tumble down cliffs, and still others quickly and violently shift masses of rock and soil. Scientists were surprised by the extent and distance traveled by the tragic Oso landslide that occurred on March 22, 2014 in Washington State and took 43 lives. It was only after geologists examined high resolution lidar images that they realized there might have been landslides nearby that travelled similar distances in the past.

Landslides affect all 50 states, yet the U.S. Geological Survey (USGS), the federal agency responsible for landslide monitoring, assessment, and research, only has an annual budget of \$3.5 million for their Landslides Hazards Program. This investment is dwarfed by the costs that can result from a single landslide. Washington Governor Jay Inslee estimates the cost of damages and cleanup of the Oso landslide will add up to at least \$42 million. Landslides can destroy homes and businesses, claim lives, make highways impassable, and change the geomorphology to form features like lakes where they did not previously exist.

Lidar, which stands for "light detection and ranging," is a critical tool for understanding landslide susceptibility. Lidar behaves similar to radar but sends out high-speed pulses of laser light, rather than radio waves, from an

airplane. The light bounces off trees, the ground, or buildings and detection instruments on the plane pick up light that bounces back. Lidar proves especially valuable because scientists can process the data to strip away vegetation and leave an accurate 3D model of the bare earth. The bare earth data allows geologists to see evidence of landslides that otherwise may have gone unnoticed. USGS leads the 3D Elevation Project, also known as 3DEP, which aims to map the conterminous United States, Hawaii, and the U.S. territories with lidar in an eight year period; Alaska will be mapped with a technology called ifsar (interferometric synthetic aperture radar) that works better with cloud cover. The 3DEP partnership project involves various federal agencies including the National Oceanic and Atmospheric Administration (NOAA) and the Federal Emergency Management Agency (FEMA). USGS and its partners plan to collect data for areas at high risk for natural disasters on a continuing basis to monitor changes that could indicate a hazard materializing.

Some states, like Pennsylvania and North Carolina, have decided it is in their best interest to acquire lidar data for the whole state. However, the quality of existing lidar data varies. USGS says that data collected as part of the 3DEP partnership will have a resolution two or three times better than average existing data. Both North Carolina and Pennsylvania would see improved accuracy from 3DEP-type lidar. Improved accuracy is critical for the safety and preparedness of communities. For example, low-quality lidar data was available for the Oso, Washington area, yet it was only in high-quality, post-landslide lidar maps that ancient landslide deposits became easily identifiable. T

he 3DEP initiative will be cost effective because the collection of lidar elevation data is roughly 25 percent less expensive when done in large quantities. The National Enhanced Elevation Assessment, conducted in advance of 3DEP, predicts that enhanced elevation data could result in \$13 billion in annual economic benefits. The 3DEP data collected would be open for public and private use creating the opportunity for companies to create marketable products from the data provided. Federal agencies like USGS could use the data to help make an updated national map of landslides to replace the last map from 1982, which is highly inaccurate.

President Obama acknowledged the benefits of the 3DEP program and supported the 3DEP program in his fiscal year (FY) 2015 budget request.

Having lidar data available, however, is not enough. Coordination between state geological surveys and federal agencies can help turn this lidar data into landslide hazard maps that can be used by government offices, businesses, and private citizens. Jennifer Bauer and Stephen Fuemmeler, geologists who used to create landslide maps for the North Carolina Geological Survey until the state program was defunded, currently own and operate Appalachian Landslide Consultants, PLLC and provide services such as landslide hazard mapping and property evaluations. Bauer and Fuemmeler explain that identifying past landslides takes a trained eye, expertise, and field investigations to verify. Their company determines areas that could be susceptible to landslide hazards using a model they say considers “a combination of ground surface geomorphology characteristics derived from the lidar along with the locations of known landslides. The more accurate the ground surface data is, the better your model will show which areas are potentially unstable.”

In addition to mapping, federal and state agencies are working to create landslide early warning systems in some areas of the country. NOAA’s National Weather Service and USGS have partnered on a program in southern California to provide an early-warning system for debris-flows and flashfloods in areas recently affected by wildfires. Interest in this type of program is gaining momentum: In June, Senator Mark Udall (D-CO) called on leadership from the Senate Appropriations Committee to provide robust funding for a similar program in Colorado that he believes is needed to protect communities from the effects of wildfires, which can include landslides.

Landslides get far more attention after a catastrophe when damages have occurred and lives have been lost, rather than before an event occurs. Increased funding for landslide hazards programs is critical to making our communities more informed and prepared for landslide hazards. The Oso landslide was a wake-up call to the country. In response, groups like the state geological surveys are realizing that we should prioritize landslide hazard identification and monitoring. The lidar from the 3D Elevation Program could be an important part

in landslide hazard identification because it produces high-accuracy data that are crucial in identifying past landslides that suggest an area is prone to hazards in the future. If 3DEP and hazard mapping programs are to succeed, they will need a sustained commitment far beyond when public memory begins to fade and the Oso landslide stops making headlines.

Assessing the Risks and Policy Responses to Induced Seismicity

By Zachary Schagrin

Advancements in geoscience technologies ranging from wastewater injection to carbon capture and storage (CCS) have created economic opportunities and environmental benefits. These opportunities and benefits, though, come at a price, and understanding those costs is important. Induced seismicity represents one of the major concerns associated with these new methods, and both scientists and policy makers are working toward understanding and addressing their implications. The combined efforts of geoscientists researching the causes and effects of induced seismicity, industry carefully implementing safety protocols and adapting to new methods, and governmental oversight and legislation regarding seismic events are crucial to managing this issue.

Induced seismicity describes a seismic event resulting from human activity rather than natural processes. These events can occur as a consequence of wastewater injection and CCS, or from activities like hydraulic fracturing and geothermal systems. The nature of these activities, in conjunction with local geologic conditions, serves as the main driver of seismicity. However, the phenomenon of induced seismicity is not new. Geoscientists have documented occurrences for over half a century and are conducting long-term studies to better understand induced seismicity.

In hydraulic fracturing, fluids are injected into a rock formation in order to fracture the rock and create a pathway by which oil and natural gas can be extracted from the formation, whereas wastewater injection involves selecting a rock formation with a high porosity and injecting fluids. Induced seismicity can be triggered if fluid injected into a reservoir flows along a fault or fracture near a critical state of stress. The resulting net

change in pore pressure can cause a fault to slip or earthquake to occur earlier than normal. Comparable situations exist for hydraulic fracturing; seismic activity can result from changing stress caused by fluids being pumped into wells to fracture rocks and release natural gas or oil, as well as from the removal of fluids from rock pores.

Some of the 151,000 Class II injection wells in the U.S. experience seismic events thought to be associated with oil and natural gas production activities. These events are generally characterized by limited, low magnitude ($M < 2$) ground shaking usually imperceptible by humans. However, seismic activities do not occur exclusively during injection or extraction and are not restricted to the immediate area around a well. Furthermore, the scale of the earthquakes has not always remained relatively low.

Cooperation among government agencies serves as a critical element of mitigating induced seismicity. According to the 2013 National Research Council (NRC) report, "Induced Seismicity Potential in Energy Technologies," government agencies like the Environmental Protection Agency (EPA), U.S. Geological Survey (USGS), and the Department of Energy (DOE) should work together and with state regulatory agencies and geological surveys to focus on this issue. For example, the USGS and the Oklahoma Geological Survey (OGS) have worked together to set up a network of 15 seismic stations to more accurately locate the epicenter of earthquakes. This valuable information provides researchers a better idea of whether nearby injection wells cause the seismic events. The Oklahoma case also highlights the necessary methods to prevent large-scale induced seismic events. The so-called "traffic-light" system of monitoring recommended by the NRC has proven effective in reducing the impact of induced seismicity. Under this system, operators monitor injection volume and pressure and when they detect seismic activity, they either lower the volume and pressure or halt injection altogether until a new method can be developed.

Partnerships between USGS and OGS provide a useful precedent for future cooperation, though challenges still exist. Government agencies may not have funding appropriated for monitoring seismic events on such a detailed scale. The USGS, for example, has money allocated for national monitoring of earthquakes but would

need additional funds to study seismicity on the scale necessary for induced seismicity monitoring. In order to carry out any studies or monitoring activities, agencies will have to commit resources and Congress will have to act to fund these efforts.

Legislative officials have focused attention on the risks of induced seismicity, as well. The Senate Energy and Natural Resources Committee discussed the topic at a hearing on June 19, 2012, during which then-Chairman Jeff Bingaman (D-NM) noted that the rate of earthquakes in the central part of the United States has been rising, but that risks of manmade earthquakes from energy technologies are minimal, while Senator Lisa Murkowski (R-AK) called the risks "remote." Representatives Henry Waxman (D-CA) and Peter DeFazio (D-NJ) have each called for hearings to be held to discuss the risks of induced seismicity, citing concern that the current Safe Drinking Water Act Underground Injection Control program is not equipped to address the risks posed to infrastructure. Despite these actions, Congress has not implemented any legislation specifically regarding induced seismicity.

While the risks of such seismic events are low in the majority of cases, a cause for public concern still exists. Geoscientists have been studying these seismic events for nearly a century and continue to do so. There is a large amount of data available on the subject, and with growing usage of injection technology for activities such as CCS, even more data will become available. Industry must continue to use this information to adapt their techniques and guarantee safety. It is critical that government uses the lessons learned and incorporates them into regulations that everyone will have to follow. Although these seismic events are impossible to avoid completely, these steps will ensure that they are addressed effectively and that the general public has a comprehensive and accurate understanding of induced seismicity.

A New Frontier: Climate Change, Resources, and Politics in a Changing Arctic

By Lily Strelch

A new frontier is opening in the Arctic as melting ice reveals unexploited resources and new trade routes.

These opportunities are associated with environmental and geopolitical repercussions, however. The possibility of economic development has prompted territorial disputes, and increased activity threatens local ecosystems. A network of robust international partnerships will help ensure responsible Arctic exploration, but the United States will need to adopt new strategies in order to stay competitive in a fast-changing region. Economic benefits and environmental protection are at stake, and a few key policy changes may be necessary to secure America's sovereign rights in the Arctic.

The Arctic Circle sits above 66° 32" latitude north of the Equator, encompassing 20,000,000 km² of land and ocean. Today, 4.2 million people live within the Arctic Circle and although growing development has created challenges—for example, the Prudhoe Bay oil spill in 2006 and consistent leakage from Russian oil rigs—the Arctic remains an attractive frontier central to new resources, scientific research, and delicate diplomatic relations.

Despite harsh climate conditions and poor accessibility, there is a long history of exploration and resource extraction in the Arctic. The promise of untapped resources including oil and gas reserves, newly emerging shipping routes, and a fishing industry worth billions of dollars make the Arctic a diamond in the rough. Historically, the steep cost of development has prevented resource extraction to some extent, but as technological advances and a warming climate make growth more economical, this will most likely change. For example, exploration for energy resources has steadily grown since the initial discovery of the Tazovskoye oil and gas field in western Siberia in 1962. In 2008, the U.S. Geological Survey (USGS) estimated that approximately 90 billion barrels of oil, 1,669 trillion cubic feet of natural gas, and 44 billion barrels of natural gas liquids may be located in the Arctic, of which 84 percent is expected to occur offshore. Scientists at USGS now speculate that oil hidden under the quickly melting ice could provide 22 percent of the world's supply. American foreign policy will need to reflect the importance this information lends the polar region.

A comprehensive Arctic policy will need to address climate concerns as well. According to the National Snow and Ice Data Center, the Arctic is warming at roughly

twice the rate of the rest of the planet; since satellite imaging began in 1979, polar ice cover has decreased by more than 20 percent. Scientists expect the Arctic to be ice-free in the summer months by midcentury. Changes in the Arctic Ocean have produced some of the most alarming effects: in 2007, the Northwest Passage, a sea lane through Canada's Arctic Archipelago, was free of ice for the first time in modern human history.

An accessible Arctic greatly impacts national security. The domestic laws and regulations of the five nations bordering the Arctic—Canada, Denmark, Norway, Russia, and the United States—extend to their respective Arctic territory. The region is further protected by bilateral, regional, and international agreements under the comprehensive 1982 United Nations Convention on the Law of the Sea (UNCLOS). This agreement establishes territorial boundaries and economic zones, as well as rules for extending rights to the continental shelf. Despite support from multiple presidential administrations, the United States Congress has so far failed to ratify UNCLOS, placing the U.S. at a disadvantage as interest in Arctic resources increases. The Convention would ensure U.S. rights to resources on and under its continental shelf territory and its ability to oversee national companies engaged in exploration and seabed mining. Furthermore, UNCLOS provides the structure for peaceful dispute resolution, and would allow the U.S. recourse if another non-signatory party chose to close its sea lanes.

Arctic melting has led to sovereignty disputes and expanded military activity in the region. In 2007, a Russian submarine descended over two miles to plant a flag on the North Pole seafloor in a symbolic gesture. Canada and Denmark have also made claims to the continental shelf, and the valuable resources it contains. UNCLOS defines exclusive economic zones (EEZ) up to 200 miles offshore from Arctic nations, with rules for extending rights to the continental shelf up to 350 miles offshore.

Both Denmark and Russia have taken advantage of these guidelines to appeal for EEZ extensions. Additionally, U.S. military activity in particular is vulnerable to other nations' claims on marine territory. Russian, British, and American nuclear submarines maneuver under the ice, and Arctic airspace is highly desirable as the most direct route between America and part of Asia. In recent years, Russian aircraft have entered Canadian

airspace, prompting increased surveillance measures in the U.S. and Canada. The U.S. Air Force keeps a ballistic missile early warning site in Greenland, and the U.S. has cooperated with Russia in counterterrorism exercises throughout the region. Ratifying UNCLOS would facilitate stronger international cooperation in these kinds of activities, and provide legal support for American sovereignty rights.

Establishing sovereignty rights will be increasingly essential as international interest in the Arctic grows. Non-Arctic nations have begun expressing their status as stakeholders, including Iceland, Sweden and Finland. As new trade routes open throughout the Arctic, countries with export economies have begun vying for influence. In 2013, India, Italy, Japan, Singapore, South Korea and China earned the status of observer states on the Arctic Council, the intergovernmental forum of Arctic nations. China is particularly interested in securing rights to traverse the Northern Sea Route across Russia and through the Bering Strait, which cuts transit time between Europe and Asia by a third, and distance by a half. China is also investing in its second icebreaker ship; these vessels are essential to clearing safe shipping lanes, as well as scientific research expeditions. Russia has a fleet of 22 icebreakers. The U.S. has only one heavy icebreaker, the USCGC Polar Star, which is already 7 years past its 30-year service lifespan. A reinvestment in icebreaker is crucial for the U.S. to remain competitive in an accessible Arctic.

Finally, the warming Arctic is a bellwether for a warming planet. Scientific research in the Arctic informs models and the understanding of how other regions will respond to higher temperatures, and the study of rapidly changing polar ecosystems is vital to designing effective conservation policy. American law makers will soon need to recognize the critical need for strong, comprehensive Arctic policy, including investment in new icebreakers, increased funding for scientific study, and long-awaited ratification of UNCLOS. Without these changes, the U.S. risks being left behind as a resource-rich, volatile Arctic begins to emerge.

First SME Congressional Fellow begins D.C. Assignment

**Reprinted with Permission from SME
John Hayden, Deputy Executive Director
Public Affairs and Government Relations**

The Society for Mining, Metallurgy & Exploration Inc. (SME) is pleased to announce that the first SME Mining Engineering Congressional Fellow, Joshua Hoffman, Ph.D., P.E., of Lexington, KY, will spend one year in Washington, D.C., working as a mining resource adviser to the staff of the House Committee on Natural Resources Subcommittee on Energy and Mineral Resources. Dr. Hoffman began his work with the committee on October 1, 2014.

Chaired by Doug Lamborn (R-CO), the Subcommittee on Energy and Mineral Resources oversees American energy production and mining on federal lands – both onshore and offshore. The subcommittee consists of 30 members; 16 Republicans and 14 Democrats.

“We are pleased with the subcommittee’s decision to utilize Dr. Hoffman’s expertise,” said SME Executive Director David L. Kanagy. “With his knowledge of mining, mineral processing and mined product applications, Josh will have the opportunity to make practical contributions as they relate to the environment, natural resources and federal science policy.”

Hoffman obtained his B.S. in mining engineering, with minors in explosives and chemistry from Missouri University of Science and Technology. He received his Ph.D. in mining engineering from the University of Kentucky with his dissertation, A Framework for Understanding the Public’s Perspectives of Mining Applied to the Kentucky Coal Industry. Hoffman chose this theme for his dissertation because of his commitment to educating the public about the importance of the mining and minerals industry.

For more information on SME’s Congressional Fellowship Program, visit <http://www.smenet.org/gpac>.

2015 -'16 SME Mining Engineering Congressional Fellowship Application Period Opens Dec. 1

Successful candidate will affect public policy in Washington, D.C.

Reprinted with Permission from SME
 John Hayden, Deputy Executive Director
 Public Affairs and Government Relations

The Society for Mining, Metallurgy & Exploration Inc. (SME) is offering a seasoned mining expert the chance to apply his or her industry knowledge to positively affect change in the laws that govern the U.S. mining and minerals industry in Washington, D.C. The second SME Mining Engineering Congressional Fellow will be placed on the staff of a member of Congress or a congressional committee during the 2015 -'16 legislative session. The Fellowship runs from September 1, 2015 to August 30, 2016. The purpose of this mining-specific Fellowship is to provide an opportunity to make practical contributions to the development of environmental, natural resources, science and public policy issues.

The first SME Congressional Fellow, Dr. Joshua Hoffman, P.E., began working as a mining resource adviser to the staff of the House Committee on Natural Resources' Subcommittee on Energy and Mineral Resources on October 1, 2014. His responsibilities involve conducting legislative and oversight work, assisting in congressional hearings and debates, preparing briefs, conducting research and writing speeches.

The application period for the 2015 -'16 SME Congressional Fellowship program runs December 1-31, 2014. Applicants must be a member of SME at the time the Fellowship term begins and have either a Doctorate in geology, mining, metallurgical engineering or mineral processing, or a Master's degree in mining or metallurgical engineering with at least three years of professional experience. Federal employees are not eligible for the fellowship. If you are interested in applying for this position, please contact John Hayden, Deputy Executive Director - Public Affairs and Government Relations, 303-948-4250, hayden@smenet.org, or Jackie Dorr at dorr@smenet.org.

The Geoscience Community Honors the Man Who shook Up Earthquake Science

Maureen Moses, AGI

The American Geosciences Institute is honoring one of the scientists who advanced earthquake hazards preparedness and mitigation in the U.S. by his superlative service to the earth sciences. This year's recipient of the Ian Campbell Medal, Dr. James "Jim" Davis, is one of the key scientists behind U.S. earthquake hazards and loss reduction policy as it is known today. He also has helped to shape how geoscientists communicate with the public to help people better understand the seismic environment they live in. Davis has been a State Geologist of not one, but two states, and has the distinction of being the longest serving State Geologist in California history, a tradition started in 1850.

His career started in New York with the New York State Geological Survey. There, he demonstrated the importance of using geology and seismology in siting of nuclear power plants and nuclear waste-disposal facilities, as well as publishing reports detailing mineral resources, developing geologic standards for a variety of environmental quality applications and creating the Northeastern U.S. Seismic Monitoring Network.

Davis' successes made him a candidate for the California State Geologist position which was vacant. He has been a strong advocate for expanding modern seismic monitoring systems as a tool for assessing regional earthquake vulnerability, enabling structural engineers to design structures that are more earthquake resistant. Emergency responders can also better evaluate post-earthquake needs. He oversaw the implementation of the Seismic Hazards Mapping Act in California which has resulted in high-resolution geologic mapping of faults, liquefaction-, and land-hazard susceptibility maps. Following the Northridge Earthquake in 1994, he accelerated seismic safety reviews of new public school construction and hospital upgrade construction designs.

Davis has taken every opportunity in his career to apply a robust knowledge of geoscience to creating legislation to protect Americans, and his techniques have been replicated globally. He is a Past-President of AGI, and his work continues with leadership positions

at AGI member organization, the Geological Society of America, and his colleagues continue to laud him for "strength, good character, and a willingness to listen to others." He has been recognized by AGI member organization the Association of American State Geologists, the Consortium of Strong-Motion Operating Systems and was awarded the University of Wisconsin Geoscientist Distinguished Alumni Award in 2008. AGI thanks Davis for his monumental contributions to geoscience and public policy.

The Ian Campbell Medal is given in recognition of singular performance in and contribution to the profession of geology. Candidates are measured against the distinguished career of Ian Campbell, whose service to the profession touched virtually every facet of the geosciences. Campbell was a most uncommon man of remarkable accomplishment and widespread influence. In his career as a geologist, educator, administrator, and public servant, he was noted for his candor and integrity. The title of the award was changed for the 2009 award to add "for Superlative Service to the Geosciences" in order to emphasize the importance of service shown by the recipient.

Dr. David R. Wunsch recognized by the American Geosciences Institute for Outstanding Contributions to the Understanding of Geoscience

Maureen Moses, AGI

This year the American Geosciences Institute is recognizing David R. Wunsch, Ph.D. with its Outstanding Contribution to the Understanding of Geoscience award. Through numerous outreach efforts, such as helping New Hampshire residents understand the collapse of the "Old Man on the Mountain," educating the U.S. public on the importance of groundwater and helping support the authorizing of the SECURE Water Act his accomplishments have been numerous and valuable to the U.S. public interest.

Wunsch became the State Geologist of New Hampshire in 2000, and over the next decade he grew the

survey tenfold both in personal and in budget. His implementation of the state geological mapping program led to many partnerships that brought critical information on local geology to residents. He turned events such as the devastating loss of a state's natural symbol, the Old Man on the Mountain, and an avulsion brought on by an extreme rain event into opportunities to educate and bring government officials, and the general public, into the field. Working with the state legislature, his efforts led to increased public support to protect New Hampshire's unique geological features from defacing and vandalism.

His major effort has been helping the U.S. public understand the important role groundwater plays in supporting U.S. society. He has helped found a federal-level committee on the subject, and served as the Director of Science and Technology for the National Groundwater Association (NGWA), a then-AGI federation member. His efforts supporting the SECURE Water Act, signed into law by President Obama, resulted in the initial phase of the National Ground Water Monitoring Network which currently has network of 2,806 wells from 29 states representing 49 principal aquifers.

This award is presented to a person, organization, or institution in recognition of an outstanding contribution to the public understanding of geoscience. The contribution may be in geoscience or how geoscience relates to economic or environmental aspects of modern civilization. The award may be given to a geoscientist, non-geoscientist, or to an organization or an institution that is geoscientific or non-geoscientific in character.

AAPG recognized for support of AGI

Maureen Moses, AGI

The American Geosciences Institute has awarded this year's William B. Heroy Jr. Award for Distinguished Service to AGI to the American Association of Petroleum Geologists (AAPG), AGI Member Organization, for its generous financial support and leadership of AGI programs.

AAPG and the AAPG Foundation's support can be seen in AGI's Education and Outreach, Geoscience Policy, Environmental and Geoscience Community Building programs – efforts that demonstrate a multifaceted service

to the AGI mission. The AAPG Foundation has supported Earth Science Week since its inception with both funds and kit materials, and contributed substantially to the formation of the education branch of AGI's Center for Geoscience Education and Public Understanding.

Kit materials and general geoscience outreach has been further enhanced by a collaboration with the AAPG Youth Educational Activities Committee, which produced a "Handbook for Visiting Geoscientists."

Collaboration with AAPG also resulted in two Environmental Awareness Series booklets. For the first, AAPG acted as a publishing partner and reviewer for the Petroleum and the Environment booklet; the second booklet, Meeting Environmental Challenges with Remote Sensing Imagery, was authored by AAPG Environmental Geoscience Advisory Committee member Rebecca Dodge.

AAPG also has supported more than 30 Geoscience Policy interns at AGI since 1998, many of who continued to careers in public policy. Moreover, AAPG has:

- * Actively supplied members for many AGI committees.
- * Provided time during its annual meeting opening session for the presentation of the AGI Marcus Milling Legendary Geoscientist Medal.
- * Worked closely with AGI's Information Services department to assist in comprehensive coverage of AAPG publications in GeoRef.
- * Helped provide expertise for revisions to the Glossary of Geology.

The award is named after William B. Heroy Jr.'s exemplary service to the American Geosciences Institute. His professional accomplishments were exceeded only by his love of geology and his commendable modesty in the face of such achievements.

Larter named 2014 Treibs Medalist



Photo Credit: GS

Stephen R. Larter, Canada Research Chair in Petroleum Geology at the University of Calgary has been selected as the recipient of the 2014 [Alfred Treibs Award](#). Larter was nominated for his major and pioneering contributions in petroleum geochemistry through fundamental understanding of origins, transformation and fates of organic materials in the

Earth and their practical application. The Treibs Award recognizes major achievements, over a period of years, in organic geochemistry. The award will be presented at the [Organic Geochemistry Gordon Research Conference](#) next month, with the Medal Talk and citation given at [Goldschmidt2015](#) in Prague, Czech Republic.

SIPES Foundation 2014 Scholarship Winners

Diane Finstrom

The SIPES Foundation, administering the scientific, educational and charitable programs of the Society of Independent Professional Earth Scientists, is very pleased to announce that ten outstanding earth science students have been selected to receive scholarship awards this year. Applications were accepted from currently-enrolled upper-division or graduate students who are U.S. Citizens studying any field of earth science or engineering, and who have a cumulative grade point average of 3.5 or higher.

Receiving \$2,500 awards from the Marvolene Speed Bennett and Carleton D. Speed, Jr. Endowed Fund; the Stephen E. Collins Scholarship Fund; and the Edward A. McCullough Endowed Fund are Monica E. Erdman, a doctoral student in earth science at Rice University; Ciel Elizalde, a master's degree candidate in geology at the University of Texas at Arlington; and Tucker O.

Martin, an undergraduate geophysics student at Texas Tech University.

Receiving a \$2,000 award funded by a gift from the SIPES Houston Chapter is Lacy A. Pyle, a doctoral candidate in earth science at Rice University. Matthew R. Pippin, a master's degree candidate in geology at Texas Tech University, received a \$2,000 award funded by a gift from the SIPES Midland Chapter.

Also receiving \$2,000 awards are Anna M. Thorsen, an undergraduate geology student at Sewanee: The University of the South; Daniel J. Vecellio, a graduate student in atmospheric science at Texas Tech University; Sadiq Odubayo, a master's degree candidate in petroleum engineering at the University of Louisiana at Lafayette; Elizabeth A. Hennessy, a master's degree student in geology at the University of Texas at El Paso; and Robert C. Mahon, a doctoral student in geology at the University of Wyoming.

Since its founding in 1981, the SIPES Foundation has awarded scholarships to more than 200 promising earth science students. Funding for the 2014 scholarship awards was made possible through generous donations from SIPES members; a bequest from the estate of Marvolene Speed Bennett, widow of the society's founding member, Carleton D. Speed, Jr.; the Stephen E. Collins Scholarship Fund; the Edward A. McCullough Endowed Fund; and SIPES Chapters in Houston and Midland, Texas. The SIPES Foundation also conducts and films educational seminars, contributes funding to earth science publications and continuing education programs, and also maintains an extensive library of earth science films.

The Society of Independent Professional Earth Scientists is a national organization of more than 1,200 self-employed geologists, geophysicists and engineers engaged primarily in domestic energy exploration and development. SIPES has eleven chapters located in oil and gas centers of the United States. Applications for the SIPES Foundation Earth Science Scholarships are available online annually after March 1.

2014 Student Presentation Award Winners

Reprinted with Permission from SSA

The SSA Student Presentation Awards recognize excellence in student poster presentations or talks at the annual meeting. The award is given to up to 15% of the number of students presenting at the annual meeting whose presentations meet absolute criteria that cover the quality of both content and presentation. The 2014 SSA Student Presentation Awards were given based on evaluation by the Student Award subcommittee, chaired by Chris DuRoss (Utah Geological Survey) and including Kris Pankow, Noel Barstow, Katsuichiro Goda, and Ryan Gold, who were assisted by dozens of evaluators among the conference attendees. From among a total of 138 student presentations evaluated at the 2014 SSA Annual Meeting in Anchorage, Alaska, the subcommittee chose the following 12 for recognition:



Sarah Barrett

Stanford

[Temporal and Spatial Clustering of Intermediate-Depth Earthquakes: Evidence for a Cascading Effect](#)

S. A. Barrett, G. A. Prieto



Sanjay Singh Bora

University of Potsdam

[A New Perspective towards the Generation of Response Spectral Ground Motion Prediction Equation for Seismic Hazard Analysis](#)

S. S. Bora, F. Scherbaum, N. M. Kuehn, P. J. Stafford, B. Edwards



Ashley Cabas

Virginia Tech

[The Importance of the Elastic Half Space Assumption in Site Response Analysis](#)

A. Cabas, A. Rodriguez-Marek, R.A. Green



Demian Gomez

Center for Earthquake Research and Information

[A Linear Formulation for Earthquake Location in a Homogeneous Half-Space Based on the Bancroft Algorithm Developed for GPS Location](#)

D. D. Gomez, C. A. Langston, R. Smalley



Kayla Kroll

UC Riverside

[Modeling Observed Aftershock Sequences with an Earthquake Simulator](#)

K. A. Kroll, K. B. Richards-Dinger, J. H. Dieterich



Patricia Martínez-Garzón

GFZ German Research Centre for Geosciences

[Induced Seismicity Mechanisms at The Geysers Geothermal Field from the Analysis of Stress Field Variations Related to Fluid Injection](#)

P. Martínez-Garzón, G. Kwiatek, M. Bohnhoff, G. Dresen, C. Hartline



Vanessa Napoli

Boston College

[Ms Unified: A New Magnitude for Rayleigh and Love Waves with Application in the Korean Peninsula and Yellow Sea Region](#)

V. Napoli, J. Bonner, D. Russell



Paul Ogwari

CERI - University of Memphis
Characteristics of Induced/Triggered Earthquakes during the Guy-Greenbrier Earthquake Sequence (2010-2011) in North-Central Arkansas

P. O. Ogwari, S. P. Horton, S. M. Ausbrooks



Maureen Walton

The University of Texas at Austin
Institute for Geophysics
Basement Structure and Earthquake Hazards along the Queen Charlotte-Fairweather Fault System, Southeastern Alaska

M. A. L. Walton, S. P. S. Gulick, P. J. Haeussler, E. Roland



Lindsay Sabey

Virginia Tech
Body and Surface-Wave Ambient-Noise Seismic Interferometry across the Salton Sea Geothermal Field, California

L. E. Sabey, J. A. Hole, L. Han, J. M. Stock, G. S. Fuis



Ashley Streig

University of Oregon
3D Comparison of Coseismic Fold Deformation for the Last 5 Events across a Releasing Step-over at the Frazier Mountain Paleoseismic Site, Southern San Andreas Fault, CA

A. R. Streig, R. J. Weldon, K. M. Scharer



Katharina Unglert

University of British Columbia
Volcanic Tremor and Frequency Gliding during the 2011 Kamoamo Eruption, Kilauea, Hawai'i

K. Unglert, A. M. Jellinek

Society of Economic Geologists, Inc. (SEG) Executive Committee

Effective January 1, 2015 – December 31, 2015

François Robert, President & Chair

Robert P. Foster, President-Elect

Judith A. Kinnaird, Past President

A. James Macdonald, Vice President for Regional Affairs

Richard J. Goldfarb, Publications Board Chair

Harold J. Noyes, Treasurer

Brian G. Hoal, Executive Director, ex officio

Honoring Peter Ziegler and David Roberts

Heather Saucier, AAPG EXPLORER Correspondent

The global contributions to geology of the late Peter Alfred Ziegler of Switzerland and the late David Gwyn Roberts of Wales made such an impact on academia and industry that two special memorial sessions were held in their honor at the AAPG's International Conference and Exhibition in Istanbul in September.

Both were Honorary members of AAPG, and both left behind a legacy of geologic knowledge and insight that most believe will be felt for generations to come.

The invited papers honored what both men brought to the world of geosciences.

So who were these men – and exactly what is being remembered in these sessions?

Peter Alfred Ziegler (Nov. 2, 1928 – July 19, 2013)



Photo Credit: AAPG

Perhaps known most for compiling the Geological Atlas of Western and Central Europe, Peter Alfred Ziegler is remembered for integrating four primary areas of geological study: tectonics, basin evolution, stratigraphy and petroleum geology.

Capable of putting highly complex pieces of the earth's puzzle together, Ziegler spent much of his career mapping the subsurface of the earth in western and central Europe in a geological atlas that became a benchmark publication in 1982 (and revised in 1990).

Building upon existing data, Ziegler took information from pervasive rock outcroppings, bore holes, vegetation and other sources, and applied his knowledge of tectonic evolution and its linkage to sedimentary basin systems known for oil and gas rich reservoirs.

For western and central Europe, the atlas became the impetus for the dawn of successful hydrocarbon exploration. Today, many consider northwest Europe one of the

best-documented hydrocarbon provinces in the world, and the foundation for the development of one of the world's foremost hydrocarbon provinces.

"I had the great privilege to meet him in the Netherlands when he was working for Shell in the Hague, and I closely collaborated with him for over 30 years," said Sierd Cloetingh, professor of tectonics at Utrecht University in the Netherlands.

"Peter was deeply respected by the Netherlands scientific community," Cloetingh said, "evidenced by his membership of the Royal Netherlands Academy of Sciences and his honorary doctorate at Delft University of Technology."

What most may not realize is that much of Ziegler's work on the atlas was performed in his spare time, out of the sheer joy of playing detective, said AAPG member Andrea Moscariello, a professor of earth and environmental sciences at the University of Geneva.

"He had an extremely inquisitive mind, and he was extremely intelligent and always asked the right questions of himself. He was a person of uncommon ability to put all of the elements together," Moscariello said.

Ziegler's career consisted of 20 years of university teaching and research and 33 years as an exploration geologist in the petroleum industry, working for Shell in Canada and in the Netherlands.

At the university level, he was revered by many students for his ability to communicate complex subject matter in simple terms – just as he did in his atlas, making it highly accessible for students and young geologists, Moscariello said.

Ziegler also is noted for two equally important publications: the "Evolution of the Arctic-North Atlantic and the Western Tethys," published in 1988, and the "Evolution of Eurasia," published in 1989.

He retired from Shell in 1988 but continued a very active geological career, publishing widely in international journals and thematic volumes on the processes controlling extensional and compressional intraplate tectonics and on the evolution of the lithosphere.

In 1992 he was appointed Honorary Lecturer at the University of Basel, and in 1996 as Titular Professor for Global Geology.

He was elected Fellow of the Geological Society in 1978 and made Honorary Fellow in 1983. In 1988 he

received the William Smith Medal and in 1992 gave the William Smith Lecture on "Plate-Moving Mechanisms: Their Relative Importance."

He also was honored by the AAPG as a Distinguished Lecturer, and by the Belgian Geological Society, the Royal Geological and Mining Society of the Netherlands, the Geological Society of Glasgow, the Geosciences Union, the German Geological Society and the Russian Academy of Natural Sciences for his work.

"I consider Peter Ziegler the father of modern sedimentary basin analysis," Cloetingh said. "By putting basins in their lithospheric context, constrained by high-quality data sets including seismic reflection data and tectonic reconstructions, he set the stage for quantitative data-interactive basin studies.

"Peter was an immensely important bridge between industry and academic research on basins," he added. "He generously shared his vast knowledge and insights gathered through his numerous studies on basins around the globe with the community at large.

"He was a true giant, both as a person and as a geologist."

David Gwyn Roberts (Jan. 4, 1943 – July 5, 2013)



Photo Credit: AAPG

Many tributes have been written to honor AAPG Honorary member David Gwyn Roberts, also known as "DGR," who has been described as a quintessential oceanographer/geoscientist, oil explorer, author, teacher and mentor.

His accomplishments span his multiple careers, and he can be considered one of the most influential geoscientists of his generation, said Keith Gerdes, AAPG Europe Region president and global exploration advisor for Shell International.

Realizing that marine geology and geophysics were areas in which major contributions to geoscience could be made – especially in the wake of Frederick Vine's and

Drummond Matthews' 1963 publication on seafloor spreading and the mechanisms of plate tectonics – Roberts left his post-doctoral studies to join the Institute of Oceanographic Sciences in the United Kingdom to study the oceans of the world.

His work focused on the structural and stratigraphic evolution of the continental margins of the North Atlantic, which he studied in collaboration with the major French institutions such as the Institut Francais du Petrole (IFP). The concepts developed in his publications with Lucien Montadert and other co-workers during this time established many of the basic principles for the future study of continental margins, Gerdes said.

Roberts subsequently was made a doctor of science by the University of Manchester, his alma mater, for this groundbreaking work.

In 1981, Roberts joined the oil and gas industry, leading a new Basin Studies and Sequence Stratigraphy Group for BP, where he identified an urgent need for formal geosciences training. This led to Roberts' creating a suite of iconic courses based on the principles of play-based exploration and technical excellence.

Working with the many geoscientists he trained through these courses, Roberts was responsible for major exploration successes for BP in the Gulf of Mexico, Egypt, Angola, Africa and the Far East.

In recognition of his dedication to science and to others, BP elevated him to the role of "Distinguished Advisor in Exploration" – the highest technical leadership role in the company.

"His influence and impact on our thinking and understanding of geoscience, particularly during the 1980s and 1990s, were profound," wrote AAPG member Mike Bowman, professor of development and production geology at the University of Manchester, in a November 2013 issue of the AAPG BULLETIN.

"His legacy will live on in those he mentored," Bowman wrote, "and in his enormously influential contributions to the science of geology."

After 22 years of service Roberts retired from BP but continued to work practically full-time, consulting with numerous oil companies and government organizations. He chaired and co-chaired major conferences and played active roles in various societies and advisory panels.

He was Honorary Fellow at The Royal Holloway College, University of London; a visiting professor at the IFP in Paris; and a Senior Research Fellow at the Southampton Oceanography Centre.

Roberts also was the founder and editor in chief of the *Journal of Marine and Petroleum Geology* and author of more than 80 publications and books, culminating in his magnum opus, "The Regional Geology and Tectonics of the World" (3 volumes, 2,500 pages), which he co-edited with his great friend, AAPG Honorary member Bert Bally.

His numerous awards and citations include: two Certificates of Merit, the Distinguished Service Award and the Robert H. Dott Memorial award from AAPG; and the Petroleum Medal and prestigious Coke Medal from the Geological Society of London.

Roberts was made an honorary member of the AAPG in 2001 and served as president of the European Region. In 2006, he was made an honorary member of the Geological Society of America (GSA), an award bestowed on only two non-Americans each year.

His knowledge of geoscience has often been described as "encyclopedic," yet he is also remembered for his unique ability to motivate and inspire other scientists.

"It is these attributes as much as his professional achievements that explain why he was held with such warmth, respect and genuine affection by those who were fortunate enough to work and learn from him," Gerdes said.

"It is why his passing is so keenly felt by the global geoscience community."

SEG COURSE CENTER EVENTS | segweb.org/events

Senior Exploration Management Course



SEG Course Center | Littleton, CO, USA
December 2-5, 2014, 8:30am – 5pm



Organizer: Society of Economic Geologists (SEG)

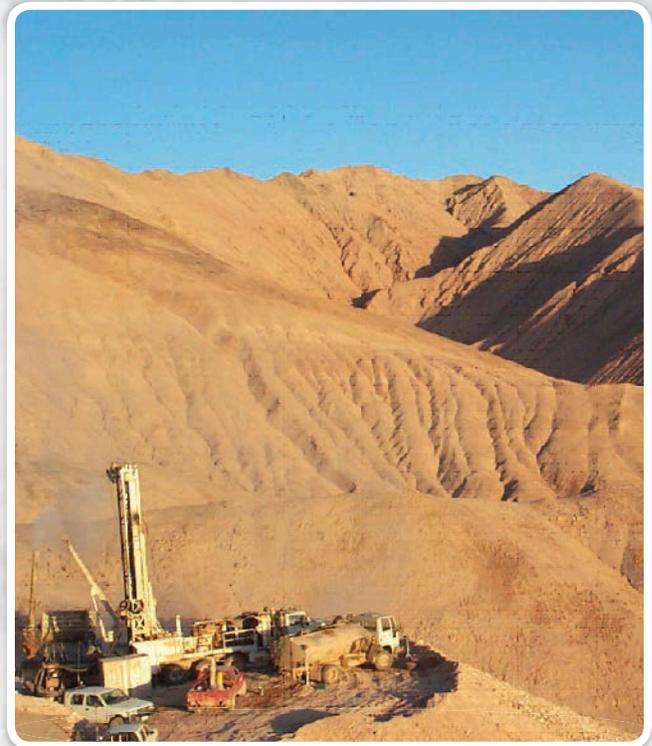
Presenter: Western Mining Services (WMS)

SCOPE

This four-day training course concerns the principles and practices of effective exploration management. The curriculum covers the spectrum of technical and business issues that senior exploration managers typically confront.

- Mineral exploration at the strategic scale – the roles of greenfields and brownfields exploration in development and implementation of corporate growth strategies
- Designing and managing exploration programs and portfolios
- The importance of group structure, program design, process discipline and effective people management in achieving exploration group objectives
- Opportunity generation including the exploration search space concept, targeting science and the application of targeting models
- How to negotiate land and minerals access deals, identify and manage nontechnical project risks, engage in early stage evaluation of project economics, and maintain the important social license to operate exploration projects in varied risk environments

The course format utilizes lecture and workshop and stresses interactive thinking and problem solving. Participants work in teams to design solutions for exploration management challenges and present their results to the larger group.



WHO SHOULD ATTEND?

This course is ideal for regional and country exploration managers, for senior project managers who are on track to move into positions of senior responsibility, and for geoscientists who aspire to senior exploration management roles. The course is also recommended for commercial managers who participate in mineral exploration programs as well as government and academic professionals who interact with the mineral exploration industry.

WMS and the **Centre for Exploration Targeting, University of Western Australia (CET)**, first presented this Course in February 2010. Participant reviews and referrals have been excellent, and the Course has become a regular event with **SEG** and **CET** sponsorship. This SEG-sponsored Course in December 2014 will be the ninth Course presentation, and that is in addition to numerous in-house Courses presented by WMS based on the general Course curriculum but tailored to the needs of the individual company.

AGU FALL MEETING

San Francisco, CA

December 15-19, 2014

With nearly 24,000 attendees, the AGU Fall Meeting is the largest Earth and space science meeting in the world. Now in its 47th year, the AGU Fall Meeting is the best place to present your research, hear about the latest discoveries, trends, and challenges in the field, and network and make connections that can enhance your career.

The AGU Fall Meeting brings together the entire Earth and space sciences community for discussions of emerging trends and the latest research. The technical program includes presentations on new and cutting-edge science, much of which has not yet been published, meaning you'll return to work with knowledge you can't get anywhere else.

More than 95% of past attendees say their AGU Fall Meeting experience was worthwhile. Why? Attendees say it's the best place to gain insights and updates on the latest scientific research and network with both luminaries and up-and-coming talent across disciplines.

With more than 1700 sessions, the AGU Fall Meeting's scientific program spans the Earth and space sciences, offering something for everyone no matter their scientific discipline. The meeting offers a unique mix of more than 23,000 oral and poster presentations, a broad range of general sessions, more than 50 formal and informal networking and career advancement opportunities, and an exhibit hall packed with approximately 250 exhibitors showcasing new and relevant research tools and services that could help scientists and researchers streamline their work.

Attendees are encouraged to explore beyond their primary field of interest and to learn about related fields through SWIRLS. SWIRLS offer an interdisciplinary walk through the AGU Fall Meeting by categorizing sessions and presentations as part of broader themes in the Earth and space sciences. Examples of themes from past years include Characterizing Uncertainty, Computational Methods Across Scales, and Dust and Aerosols. [Learn more about 2014/2013 SWIRLS.](#)

The 36th ANNUAL FM-MSA-TGMS - TUCON MINERAL SYMPOSIUM

Tucson, AZ

Saturday, February 14, 2015

Minerals of Western Europe

The thirty-sixth annual symposium held in conjunction with the Tucson Gem and Mineral Show will take place on Saturday, 14 February 2015. The symposium is cosponsored by the Tucson Gem and Mineral Society, the Friends of Mineralogy, and the Mineralogical Society of America. As a tie-in with the show, the symposium theme is the same as the show theme: Minerals of Western Europe. Presentations on descriptive mineralogy, classic and new localities, and related subjects are welcome. An audience of amateur and professional mineralogists and geologists is expected.

Anyone wanting to present a paper should submit a 200-300 word abstract to Julian C. Gray, Tellus Science Museum, PO Box 3663, Cartersville, GA 30120; email juliang@tellusmuseum.org; phone 770-606-5700, ext. 415. Presentations will be twenty minutes in length. Abstracts must be submitted by 31 August 2014.



SEG
www.segweb.org



Short Course on the Geology of Gold Deposits

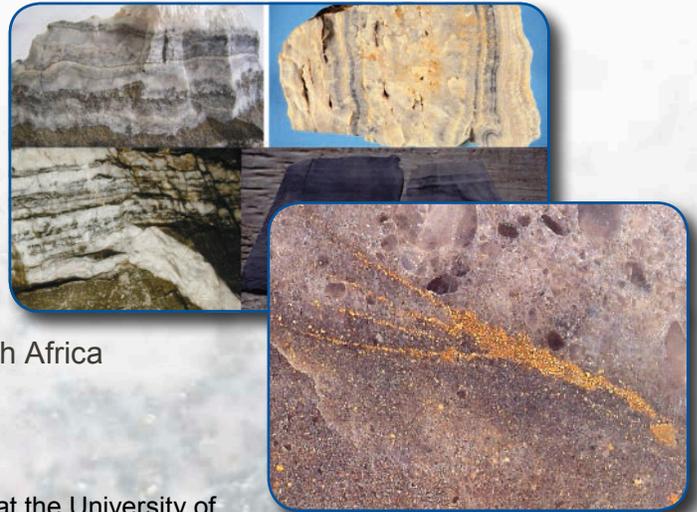
The University of Cape Town | Rondebosch, South Africa
February 7–8, 2015

DESCRIPTION

SEG is again offering its highly successful Gold Course at the University of Cape Town on February 7–8, 2015, the weekend prior to the Mining Indaba meeting. The course will focus on the distribution, geology, important characteristics (geochemistry, geophysics, structure, alteration, mineralogy), genesis, and exploration criteria of the most important gold deposit types. Industry geologists, as well as upper level undergraduate and graduate students in economic geology, will find the course relevant and useful.

Deposit examples include material from Africa and throughout the world.

This course fills up quickly—We recommend registering early for the 2015 event!



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.



■ **Hartwig Frimmel**

Professor at the University of Würzburg, Germany and honorary research associate of the University of Cape Town; his research focuses on the Witwatersrand goldfields and the interplay between tectonics, paleoclimate, ocean chemistry, and ore mineralization.



■ **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.



■ **Brian Rusk**

Research associate at Western Washington University, in Bellingham, Washington; he specializes in mineral geochemistry and fluid inclusion microanalysis of hydrothermal fluids in ore-forming environments, particularly in IOCG and porphyry Cu (Au-Mo) deposits.

REGISTRATION Online at segweb.org/events#15RGOLDUCT

Early Registration *(through January 15, 2015)*

Member: US\$895
Non-member: US\$995
Student: US\$395
Student Non-member: US\$445

Late Registration *(after January 15, 2015)*

Member: US\$995
Non-member: US\$1095
Student: US\$445
Student Non-member: US\$495

Please note that SEG reserves the right to cancel this event should minimum attendance numbers not be met by January 15, 2015. For further information on cancellation policy, event photography, and dietary restrictions, visit www.segweb.org/tc.

2015 ASLO AQUATIC SCIENCES MEETING

**Granada, Spain
February 22-27, 2015**

ASLO returns to Europe for the 2015 Aquatic Sciences Meeting on 22-27 February 2015 at the Granada Congress and Exhibition Centre (Palacios de Exposiciones y Congresos de Granada) in Granada, Spain

The 2015 meeting will contribute to the ongoing international development of ASLO by bringing together a diverse group of participants at a site where many cultures have engaged throughout the centuries. Located in the South of Spain, Granada is anchored by the Sierra Nevada Mountains, the highest mountain range of the Iberian Peninsula and the tropical coast of the Mediterranean Sea. With a history deep in diversity, to a present rich in culture, vitality, and acceptance, Granada is the perfect setting to bring together scientists, engineers, students, educators, policy makers and other stakeholders to engage in an international dialogue.

Plenary talks and special sessions will focus on global and regional patterns of aquatic systems in diverse northern and southern inland water biomes and oceanographic provinces emphasizing both similarities and differences. This theme is a critical scientific challenge as our discipline moves to understand and confront human accelerated environmental change. Along with ASLO members from North America and Europe, we anticipate Granada will be attractive to Latin American, African, and Middle Eastern aquatic scientists. We hope to attract all in a dialogue about patterns of environmental change in aquatic systems at global and regional scales. This meeting in Granada will contribute to the ongoing international development of ASLO by bringing together a diverse group of participants at a site where many cultures have engaged through the centuries.

For more information:

Conference Management Office

The Schneider Group, Inc.

5400 Bosque Blvd., Suite 680

Waco, TX 76710 USA

Telephone: +1 254-776-3550

Fax: +1 254-776-3767

E-mail: aslogranada2015@sgmeet.com

KARSTOLOGY IN ARID REGIONS

**Abu Dhabi, United Arab Emirates
March 2-9, 2015**

Karst Research Institute in Slovenia are partnering with the Emirates Geographical Society to host the conference, Karstology in Arid Regions. This important meeting will be held on 2-9 March 2015 in Abu Dhabi, United Arab Emirates.

The main topics of the conference will be:

- Karst in arid regions
- Karst surfaces, caves, waters, ecology
- Teaching about karst
- Development challenges in karst regions
- Development of karstology in arid regions

For the first circular, more details, and who to contact with questions, visit <http://abudhabi.zrc-sazu.si/>.



SAGEEP

**Austin, Texas USA
March 22-26, 2015**

Sheraton Austin at the Capitol

Plans are underway to host the next Symposium on the Application of Geophysics to Engineering and Environmental Problems (SAGEEP) in Austin, Texas March 22-26, 2015. Local organizers Jeff Paine (General Chair), Doug Laymon, and Dennis Mills are working with EEGS staff to infuse a uniquely "Austin" experience into the 28th edition of SAGEEP, while simultaneously putting together a strong technical program under the guidance of Brad Carr (Technical Chair).

Be sure to make early plans to attend; Austin is a very popular spring destination and flights and rooms fill up quickly. South by Southwest SXSW is a set of film, interactive, and music festivals and conferences which began in 1987 and takes place in Austin every year. Next year, it is scheduled for the week prior to SAGEEP (March 13-22, 2015) - so the city and airport will be busy! The SAGEEP hotel room block will include 3 days prior to SAGEEP, so plan to come early and attend this iconic Austin spring event!

Please send an email to Jeff (jeff.paine@beg.utexas.edu) if you would like to be on an informal email list for information about the conference as it develops. If you have an idea for a workshop or short course, now is a great time to suggest it to Jeff, Brad, or Short Course Chair Bill Doll (dollw@battelle.org). We look forward to seeing you in Austin next March!

Call for Abstracts

The Technical Program is nearing capacity. There is room for a few oral and poster presentations if you still wish to submit an abstract at the online abstract submission site, but please do so as soon as possible. The first wave of acceptance notices go out on Nov. 20. Please contact Brad (bcarr1@uwyo.edu) or Jeff (jeff.paine@beg.utexas.edu) with any special circumstances. Final revised abstracts and optional extended abstracts are due by Jan. 19, 2015. Submission details and a listing of session topics can be found at the SAGEEP 2015 Abstracts & Sessions page.

Student Scholarships Available for SAGEEP Attendance
Geometrics has announced that once again, they will make available a limited number of scholarships to offset the cost of attending SAGEEP 2015. Students wishing to apply must:

- be in good standing at their educational institution
- provide a letter of recommendation from a faculty member
- submit an application letter which includes areas of interest in geophysics, graduation date, dissertation/thesis/senior project topic and the student's thoughts on career and academic plans after graduation

Please send the letter (email only) to linda@geometrics.com.

**The deadline for application letter is
January 30, 2015.**



Why attend ATC—the E&P industry event for Arctic science and solutions?

Conference Highlights

- Plenary Session
- 5 Panels
- 150+ technical presentations
- New—The Arctic Next Wave
- 3 Topical Breakfasts
- 3 Topical Luncheons
- New—ATC Distinguished Achievement Awards Luncheon

Your conference registration includes these thought-provoking panels:

- Plenary Session
- Global Arctic Market Outlook – Regional Influences
- Arctic Technology: Leveraging Capability, Targeted Development, and Collaboration Efforts
- Regulatory Governance: Attaining Stakeholder Confidence
- Arctic Metocean
- Ice Forecasting and Routing Optimization

Exhibition

The exhibition is the ideal place to research suppliers or the latest technologies available for the Arctic. Don't miss your chance to meet face-to-face with vendors, discuss products and services, and learn more about the latest offerings. While you're on the exhibition hall floor you can research solutions, network with colleagues and enjoy refreshment breaks.

About ATC

Founded in 1969, the Offshore Technology Conference (OTC) is the world's foremost event for the development of offshore resources in the fields of drilling, exploration,

production and environmental protection. The Arctic Technology Conference (ATC) is built upon OTC's successful multidisciplinary approach, with 14 technical societies and organizations working together to deliver the world's most comprehensive Arctic event.

Sponsoring Organizations

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

Endorsing Organizations

- International Association of Drilling Contractors
- Petroleum Equipment Suppliers Association

SEG 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



Photo: Tourism Tasmania.
 ©All rights reserved. Geoff Murray.

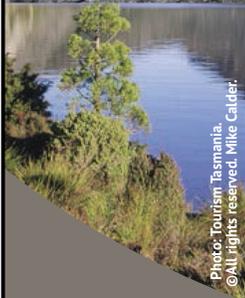
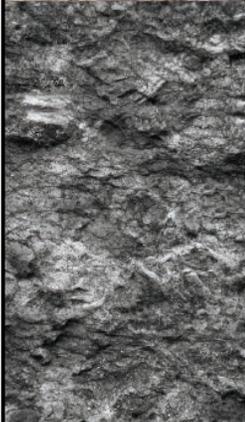


Photo: Tourism Tasmania.
 ©All rights reserved. Mike Calder.



Photo: Tourism Tasmania.
 ©All rights reserved. Mike Calder.

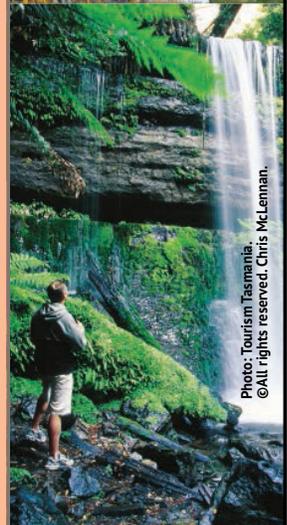
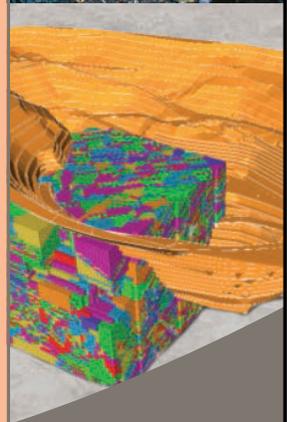


Photo: Tourism Tasmania.
 ©All rights reserved. Chris McLennan.



2015 Annual Meeting

Pasadena, CA

April 21 – 23 2015

SSA's 2015 Annual Meeting will provide a stimulating exchange of research on a wide range of topics with colleagues from all over the world. Oral presentations, poster sessions, exhibits, field trips, business meetings and social gatherings all provide participants the opportunity to meet and share with their peers.

Important Dates

Session Proposal Deadline

1 October 2014

Travel Grant Submission Deadline

30 November 2014

Abstract Submission Deadline

9 January 2015

Program and Abstracts Online

13 February 2015

Meeting Pre-Registration Deadline

15 March 2015 (12 Midnight PDT)

Hotel Reservation Cut-Off -government rate

3 March 2015

Hotel Reservation Cut-Off -regular room

17 March 2015

Online Registration Cut-Off

10 April 2015 (5 PM PDT)

AAG Annual Meeting

Chicago, IL

April 21-25, 2015

Join fellow geographers, GIS specialists, environmental scientists, and other leaders for the latest in research and applications in geography, sustainability, and GIScience.

Emerging themes for the AAG Chicago meeting

The conference will feature more than 5,000 presentations, posters, and workshops by leading scholars, researchers, and educators. Current themes for the AAG Annual Meeting include:

- Radical Intra-Disciplinarity
- Symposium on International Geospatial Health Research: Creating Synergies
- Symposium on Physical Geography: Environmental Reconstruction -- A Nexus of Biogeography, Climatology and Geomorphology
- Geography and Online Education
- GeoHumanities
- Chicago and the Great Lakes Region

Each year, the AAG identifies a few themes for its Annual Meeting to help focus discussion and provide a fresh and engaging structure to the conference program. Attendees are also invited to develop themes relevant to the meeting's location or influenced by political and intellectual trends within the discipline. As always, any topic relevant to geography is welcome at the AAG annual meeting.

"As noted above, the featured themes attempt to provide some structure to a large, exciting, highly attended meeting. But, as always, the AAG annual meeting is an open meeting, and I look forward to your contribution to the meeting and to being submerged in the diverse set of paper and poster topics that we all expect at our annual meeting."

— Julie Winkler, AAG Past President

The AAG is currently identifying more topics to help focus discussion and provide a fresh and engaging structure to the conference program, and encourages attendees to develop themes relevant to the meeting's location or subjects influenced by political and intellectual trends within the discipline. Please see the links above and to the left for more information about how to get involved with these themes.

AAPG Annual Convention and Exhibition

**Exploring the Summit of Petroleum Geosciences
May 31 - June 3, 2015**

Registration opens in February

Look for the Technical Program and Registration Announcement with the February issue of AAPG's Explorer magazine.

The world's geosciences community meets at ACE:

- **Industry strength:** As the globe's preeminent geosciences organization, AAPG is uniquely positioned to attract a focused audience of geoscience professionals and leaders from around the world
- **Target audience:** Approximately 8,500 geologists, geophysicists and engineers from around the world will be at ACE
- **Technical Content:** Peer-selected oral and poster presentations attract industry experts who appreciate the strength of the ACE technical program
- **International Appeal:** On average, 1,350+ geoscientists from outside the U.S. attend ACE each year making it the perfect place to make global contacts

Updates:

1. Call for Abstracts now closed.
2. Exhibit space available. Sign up now.

AAPG has chosen to return to the reemerging energy epicenter of Denver, Colorado next year making it a can't-miss event in 2015. Denver has consistently drawn some of the highest-recorded crowds for ACE, and preliminary signs indicate that the 2015 event won't disappoint. ACE is a world-class event, regularly attracting an average of 6,900 global attendees - geologists, geophysicists and engineers all looking for products and services to maximize their companies' reserves potential. The breadth and depth of the technical program is international in scope and appeals to multiple geosciences disciplines. ACE also boasts the International Pavilion, a place where exploration and investment professionals gather. It is the place to see, discuss and understand where our industry is headed.

See more at: <http://ace.aapg.org/2015#sthash.2htlNvNg.dpuf>



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 in November/December.

SIPES 52ND ANNUAL MEETING & 2015 CONVENTION

**June 15-18, 2015
Deer Valley, UT**

The SIPES 2015 Convention and 52nd Annual Meeting will be held at the Five Star-Five Diamond Stein Eriksen Resort in beautiful Deer Valley, Utah. Deer Valley is located about 30 minutes from Salt Lake City; the Salt Lake City International Airport is served by most major airlines.

Hotel rates and reservation information will be available after January 1, 2015. We hope to see you there!



Share your innovations, ideas and experiences at the premier integrated science and technology event for unconventional.

The second annual Unconventional Resources Technology Conference (URTeC) this August was a resounding success. More than 5,000 petroleum engineers, geoscientists, financiers, researchers and other energy professionals came together under one roof to collaborate on all things unconventional. URTeC 2015 is scheduled 20-22 July at the Henry B. Gonzalez Convention Center in San Antonio, Texas.

On behalf of three of the world's leading professional societies in oil and gas exploration and production – SPE, AAPG and SEG – we invite you to contribute your expertise and share your knowledge of integrated solutions for advancing the science, discipline and business practices necessary to maximize the development of unconventional resource plays.

Euroclay2015

July 5-10, 2015

Edinburgh University, Scotland

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.

Organised 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.



The past decade has witnessed increasing scientific focus on detailed aspects of tropical climate at and above the Earth's surface, specifically on the location of the boundary between the tropical and extratropical zones. A growing body of literature addresses the possibility of changes in the position and strength of the Hadley cell, jet streams, and zonal-mean atmospheric circulation. These changes could manifest as changes in surface climate, particularly precipitation, and have important societal and ecological consequences. A number of studies have identified poleward movement in the boundary between tropical and extratropical zones; this phenomenon has been referred to as "tropical widening" or "expansion of the tropical belt."

Tropical widening, at a rate of up to several degrees latitude per decade over the past several decades, has been estimated using a variety of methodologies applied to satellite observations, in situ measurements, and meteorological re-analyses. Although there is a basic understanding of the factors controlling the properties of the Hadley cell and jet streams, there is a large spread among these tropical widening estimates, and there is some evidence that global climate model simulations do not capture the magnitude of observed widening. It is not clear whether the large range of tropical belt width and widening estimates reflects the differing physical properties measured by different definitions of the tropical belt edge location (e.g., definitions based on surface versus upper-air parameters), differences among datasets, or the difference between the hemispheres, seasons, and time periods studied.

Because of potentially adverse societal and ecological impacts, such as shifts in the subtropical dry zones and associated changes in mid-latitude droughts, it is important to understand the causes of tropical width changes, both in the past and in the future. Several different mechanisms of tropical width change have been proposed, including atmospheric composition changes (e.g., greenhouse gases, ozone depletion, aerosols) and internal variability from both the ocean and atmosphere.

A better understanding of the relative importance of these proposed drivers is needed to enhance future predictability and help in explaining why observed tropical widening has apparently been greater than expectations from global climate model simulations. Tropical widening also corresponds to shifts in mid-latitude winds that drive ocean circulation, and it has been hypothesized to influence ocean uptake of carbon dioxide and to modulate ocean-cryosphere interactions.

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:

1. What determines the width of the tropical belt?
2. How and why has the tropical width changed in the past?
3. How and why might the tropical width change in the future?
4. What are the impacts for the oceans, cryosphere, hydrologic cycle, human society, and ecosystems?

Goldschmidt2015: Call for Sessions

August 16 - 21, 2015

Prague, Czech Republic

DEADLINE Monday December 15th

Goldschmidt2015 will be the 25th Goldschmidt conferences, and to celebrate we are returning to beautiful Prague, the same venue as Goldschmidt2011. The Goldschmidt conference is the most important forum for the discussion of recent results in geochemistry and related fields. The science committee has identified the key theme areas, and the theme convenors have proposed a range of sessions in each theme. Now the whole community is invited to view the sessions already proposed, and make suggestions for further sessions.

Please take a look at the Goldschmidt2015 Themes and Sessions already proposed and discuss with your colleagues whether there are any gaps in the program in your subject area. Any additional sessions you might propose should be broad enough to attract at least 25 abstract submissions, and the approval of all proposed organisers should be confirmed before your proposal is submitted. Please ensure that your suggested session will satisfy these criteria. If you would like to propose an additional session for Goldschmidt2015 please submit it through the website.

All sessions will be reviewed by the theme chairs and science committee and included in the list of sessions where appropriate. If you have any questions about the suitability or overlap of your proposed session with existing sessions, please contact the appropriate theme leaders (whose details are available on the conference website).

AIPG 2015 National Conference

September 19-22, 2015

Anchorage, Alaska

Hilton Anchorage Hotel

500 West Third Avenue, Anchorage, AK 99501

Hotel: 1-800-HILTONS - Room Rate: \$137

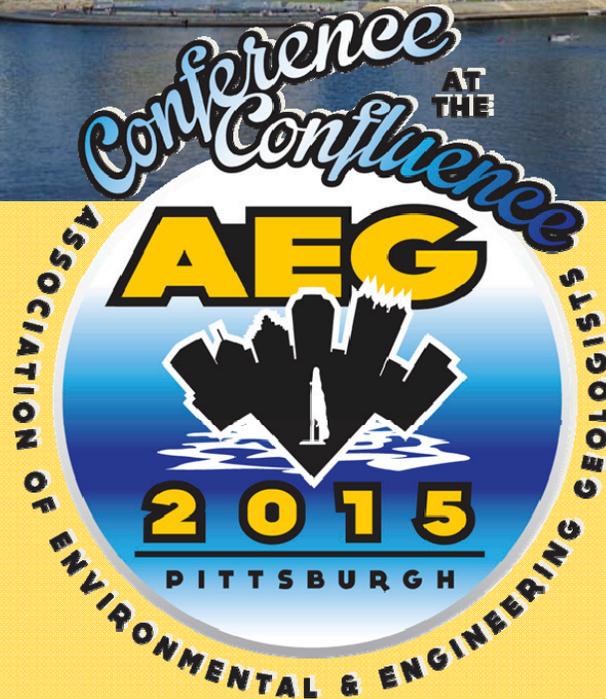
www.hiltonanchorage.com

Hosted by AIPG National and Co-hosted by AIPG Alaska Section

Join us at AEG's 58th Annual Meeting

September 19 - 26, 2015

HOSTED BY THE ALLEGHENY-OHIO SECTION



- ▶ Planned **FIELD TRIPS** to include:
Landslides of Pittsburgh, rock slopes of Ohio, dams of Pennsylvania and more!
- ▶ A full schedule of outstanding **SYMPOSIA, TECHNICAL SESSIONS, and SHORT COURSES.**
- ▶ Held at the **WYNDHAM GRAND HOTEL** at the confluence of three great rivers and the point of the "Golden Triangle" in downtown Pittsburgh.

Details at AEGweb.org beginning October 2014





14th Multidisciplinary Conference on Sinkholes

October 5-9, 2015

Rochester, Minnesota

This Chapman Conference will focus on Earth's magnetospheric dynamics: Dynamics of geomagnetic storm and substorm, the roles of reconnection in Earth's magnetosphere, and the new results of the MMS mission. Three tutorial lectures are planned: Physics of magnetic reconnections, solar flares and coronal mass ejections, and comparative planetary magnetospheres.

The deadline for abstracts is 1 December 2014—less than a month away! We strongly encourage submission of full papers, and they may be sent later if your abstract is submitted by the deadline. Send your abstract this weekend so you can relax with family and friends during the holidays at the end of the month.

If you are a student or know one, we encourage students to apply for the Barry F. Beck Student Scholarship that includes free registration to the conference plus up to \$1,000 for travel expenses. All applications must include an abstract by 1 December 2014 and its full paper by 1 March 2015. We encourage organizations and working professionals to donate to the scholarship fund to provide even more scholarships to help boost the careers of young karst engineers and scientists. All donations are tax deductible.

The Weather Channel will show an episode on sinkholes that will feature Tom Aley, who is one of the Sinkhole Conference's short course instructors. It will be first broadcast on 10 November in the USA. Check your local listings for details.

The Sinkhole Conference series has been the premier conference for all aspects of karst geoscience and related engineering and environmental issues—and not just sinkholes. This next Sinkhole Conference will be held in Rochester, Minnesota, USA, on 5-9 October 2015, and jointly organized with the Minnesota Groundwater Association it should be an exceptional meeting!

Visit <http://www.sinkholeconference.com/> for information on how to register for the conference, submit an abstract and paper, and to find all deadlines, details on the Beck Scholarship, information on short courses, field trips, and much more.