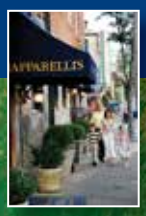


1–4 Nov. GSA 2015 in historic Baltimore, Maryland, USA.

SEPTEMBER 2015 | VOL. 25, NO. 9

GSA TODAY

A PUBLICATION OF THE GEOLOGICAL SOCIETY OF AMERICA®

GEOLOGY Rerun: Aeromagnetic Discovery of a Baltimore Gneiss Dome in the Piedmont of Northwestern Delaware and Southeastern Pennsylvania

GSA TODAY

GSA TODAY (ISSN 1052-5173 USPS 0456-530) prints news and information for more than 26,000 GSA member readers and subscribing libraries, with 11 monthly issues (March/April is a combined issue). *GSA TODAY* is published by The Geological Society of America® Inc. (GSA) with offices at 3300 Penrose Place, Boulder, Colorado, USA, and a mailing address of P.O. Box 9140, Boulder, CO 80301-9140, USA. GSA provides this and other forums for the presentation of diverse opinions and positions by scientists worldwide, regardless of race, citizenship, gender, sexual orientation, religion, or political viewpoint. Opinions presented in this publication do not reflect official positions of the Society.

Subscriptions: GSA members: Contact GSA Sales & Service, +1-888-443-4472; +1-303-357-1000 option 3; gsaservice@geosociety.org for information and/or to place a claim for non-receipt or damaged copies. **Nonmembers and institutions:** *GSA TODAY* is US$88/yr; to subscribe, or for claims for non-receipt and damaged copies, contact gsaservice@geosociety.org. Claims are honored for one year; please allow sufficient delivery time for overseas copies. Periodicals postage paid at Boulder, Colorado, USA, and at additional mailing offices. Postmaster: Send address changes to GSA Sales & Service, P.O. Box 9140, Boulder, CO 80301-9140.

***GSA TODAY* STAFF**

Executive Director and Publisher: Vicki S. McConnell

Science Editors: Steven Whitmeyer, James Madison University Dept. of Geology & Environmental Science, 800 S. Main Street, MSC 6903, Harrisonburg, VA 22807, USA, whitmesj@jmu.edu; **Gerald Dickens,** Rice University School of Earth Science, MS-126, 6100 Main Street, Houston, Texas 77005, USA, jerry@rice.edu.

Managing Editor: K.E.A. "Kea" Giles, kgiles@geosociety.org, gsatoday@geosociety.org

Graphics Production: Margo McGrew

Advertising (classifieds & display): Ann Crawford, +1-800-472-1988 ext. 1053; +1-303-357-1053; Fax: +1-303-357-1070; advertising@geosociety.org; acrawford@geosociety.org

GSA Online: www.geosociety.org
GSA TODAY: www.geosociety.org/gsatoday/

Printed in the USA using pure soy inks.

THE GEOLOGICAL SOCIETY OF AMERICA®

SFI Certified Sourcing www.sfiprogram.org SFI-00665

SEPTEMBER 2015 | VOLUME 25, NUMBER 9

Featured Articles

SCIENCE: *GEOLOGY* Rerun

Cover: The Chesapeake Bay area, with Baltimore to the north. Image courtesy NASA Goddard Space Flight Center Landsat Data Continuity Mission Education and Public Outreach team (GSFC LDCM EPO). See related article, p. 4–7.

GROUNDWORK

2015 GSA Annual Meeting & Exposition

GSA News

Cover inset photo. Little Italy. Photo courtesy of Visit Baltimore.

PREFACE:

1973 *Geology* Article Covers Baltimore Gneiss Geology

As GSA looks ahead to GSA 2015 in Baltimore, Maryland, USA, on 1–4 November, we reproduce here the **first** *Geology** journal article published on the structural geology of Baltimore and its surrounds. The study by Michael W. Higgins, George W. Fisher, and Isidore Zietz also gives a sense of the geologic mapping there as it examines the extent of the Baltimore Gneiss.

Two of the authors cited in this paper have major GSA awards named for them. Florence Bascom, the first woman hired by the USGS (1896) and the first woman vice president of GSA (1930), was well known for her geologic mapping; thus, GSA's newest award has been named for her: "Geologic Mapping Award in Honor of Florence Bascom." Randolph W. "Bill" Bromery†, GSA's first African-American president (1989), established the "Randolph W. 'Bill' and Cecile T. Bromery Award for Minorities" in 1999.

Would you like to know more about the early science and history of Baltimore? Have a look at this 1892 open-access (thanks to the Internet Archive Digital Library) *Guide to Baltimore with an Account of the Geology of its Environs*, by the American Institute of Mining Engineers: https://archive.org/details/guidetobaltimore00will.

Baltimore gneiss: A Precambrian formation of banded biotite mica gneiss and hornblende gneiss. It was formed by the metamorphosis of sedimentary and igneous rocks and was named for outcrops near Baltimore, Maryland, USA. This specimen is on display at The Geological Society of America headquarters in Boulder, Colorado, USA.

**Geology*, v. 1, p. 41–43, doi: 10.1130/0091-7613(1973)1<41:ADOABG>2.0.CO;2. All GSA journals and books are posted online at www.gsapubs.org.

†Bromery's GSA Presidential Address is online at http://gsabulletin.gsapubs.org/content/102/3/405.full.pdf.

GEOLOGY Rerun:

Aeromagnetic Discovery of a Baltimore Gneiss Dome in the Piedmont of Northwestern Delaware and Southeastern Pennsylvania

Michael W. Higgins
U.S. Geological Survey, Beltsville, Maryland 20705

George W. Fisher
Johns Hopkins University, Baltimore, Maryland 21218

Isidore Zietz
U.S. Geological Survey, Silver Spring, Maryland 20242

ABSTRACT

In the central Appalachian Piedmont the "basement complex" is an assemblage of 1,100- to 1,300-m.y.-old gneisses, migmatites, and amphibolites that crops out in "domes" mantled by younger metasedimentary rocks of the Glenarm Series. Aeromagnetic data and reconnaissance fieldwork indicate that a previously unknown Baltimore Gneiss dome, here called the Mill Creek dome, is present in southeastern Pennsylvania and northwestern Delaware. The discovery of previously unknown domes of Baltimore Gneiss has bearing on the thickness, structure, and regional relations of the Glenarm Series.

INTRODUCTION

The oldest rocks in the central Appalachian Piedmont are a complex of 1,100- to 1,300-m.y.-old (Tilton and others, 1958; Wetherill and others, 1966; Wetherill and others, 1968; Sinha and others, 1970) gneisses, migmatites, and amphibolites, collectively named the Baltimore Gneiss (Williams, 1892; Hopson, 1964). In Maryland, Baltimore Gneiss crops out in the cores of seven anticlinal domes (Fig. 1), true "mantled gneiss domes" (Eskola, 1949; Hopson, 1964) where the gneiss is unconformably overlain by metasedimentary rocks of the Glenarm Series (Knopf and Jonas, 1922, 1923; Hopson, 1964; Higgins, 1972). Baltimore Gneiss is also known to crop out in four anticlinal areas in southeastern Pennsylvania (Knopf and Jonas, 1923; Bascom and Stose, 1932; McKinstry, 1961; Gray and others, 1960; Fig. 1, this paper), where it is unconformably overlain by Glenarm Series rocks, or by Chilhowee Group rocks correlative with the Glenarm rocks (Higgins, 1972).

In most of the Baltimore Gneiss domes the gneiss is unconformably overlain by feldspathic mica schist, mica gneiss, feldspathic quartzite, and micaceous quartzite of the Setters Formation (Hopson, 1964). These quartzose rocks are overlain by marble, metadolomite, and calc-silicate rocks of the Cockeysville Marble (Choquette, 1960; Hopson, 1964), which, in turn, is overlain by a thick sequence of metasedimentary and metavolcanic rocks of the Wissahickon and James Run Formations (Knopf and Jonas, 1923; Hopson, 1964; Southwick and Fisher, 1967; Higgins and Fisher, 1971; Higgins, 1972). In some of the domes, however, the Setters rocks are absent, and the Cockeysville Marble, or even Wissahickon rocks, rests directly upon Baltimore Gneiss. In some cases this is due to faulting or to tectonic thinning (McKinstry, 1961; Hopson, 1964), but in others it is probably due to pre-Wissahickon erosion or to nondeposition of the lower Glenarm rocks (Choquette, 1960; Hopson, 1964). Fisher (1971) has shown that the Setters Formation is not everywhere a quartzose rock, however, and may be locally mistaken for Wissahickon pelitic schist.

The thickness of the Wissahickon Formation is not precisely determined because it is isoclinally folded and because there are few marker beds or units. The discovery of previously unknown domes of the "basement" Baltimore Gneiss in areas mapped as Wissahickon has bearing on the thickness of the Wissahickon as well as on the structure and regional relations of the Glenarm Series.

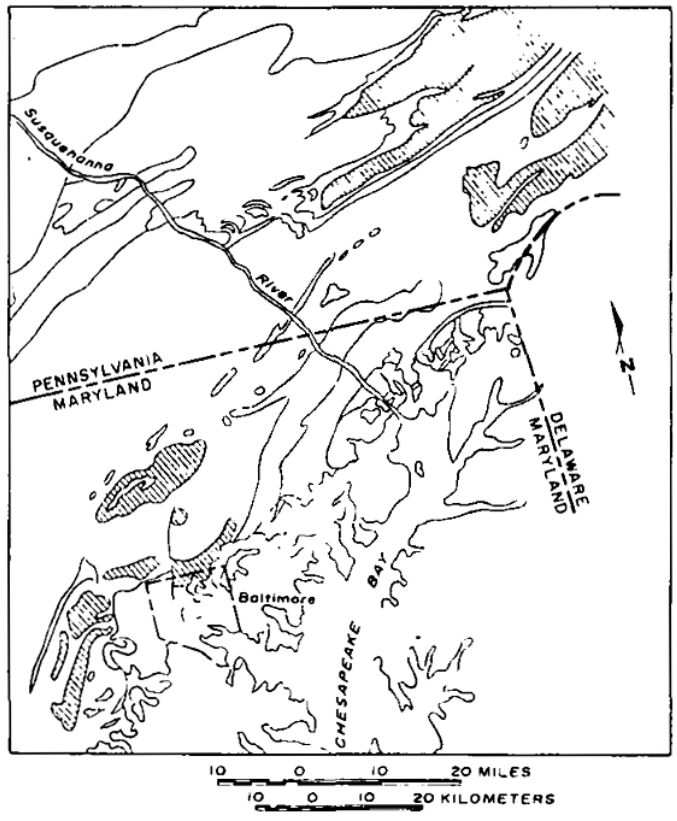


Figure 1. Generalized map of central Appalachian region, showing domes of "basement, complex" Baltimore Gneiss (line pattern) and approximate outline of newly discovered Mill Creek dome (dot pattern). (*Editor's note:* Dot pattern did not show through on original.)

MILL CREEK DOME

On aeromagnetic maps of the area around Baltimore (Bromery and others, 1964; Bromery, 1967; I. Zietz and J.R. Kirby, unpub. data), some of the northernmost Baltimore Gneiss domes coincide with distinctive deep magnetic lows. This is also true for some of the gneiss domes in southeastern Pennsylvania (I. Zietz and J.R. Kirby, unpub. data). In southeastern Pennsylvania and northwestern Delaware, near the common border of these states with Maryland, aeromagnetic maps (Henderson and others, 1963; Fig. 2, this paper) show a large magnetic low, similar in style and intensity to the lows associated with some of the gneiss domes near Baltimore. Some geologic maps of this area (Bascom and Miller, 1920; Bascom and Stose, 1932; Gray and others, 1960) show discontinuous outcrop areas of marble (Bascom and Stose and Gray and others called it Cockeysville Marble) coinciding with the gradient on the edges of the magnetic low. No Setters Formation rocks are shown in this area on any of the maps. On all the maps except Bascom and Miller's (1920), the rocks that coincide with the main part of the magnetic low are shown as

Table 1. Modal composition of gneisses from Mill Creek dome

	Sample no.		
	1715*	1718†	1716§
Quartz	25.0	30.0	12.4
Microcline	46.9	33.7	–
Oligoclase	23.2	30.9	33.3
Biotite	4.6	5.2	0.6
Hornblende	–	–	50.5
Opaques	trace	trace	1.2
Garnet	–	–	2.0
Accessories	0.3	0.2	trace
Total	100.0	100.0	100.0
Points counted	501	501	510

*Layered biotite-quartz-feldspar migmatite, Pennsylvania State Rte. 82, 305 m (1,000 ft) north of Delaware state line.

†Layered biotite-quartz-feldspar migmatite, Pennsylvania State Rte. 82, at Delaware state line.

§Garnet amphibolite, Delaware State Rte. 82, 46 m (150 ft) south of Pennsylvania state line.

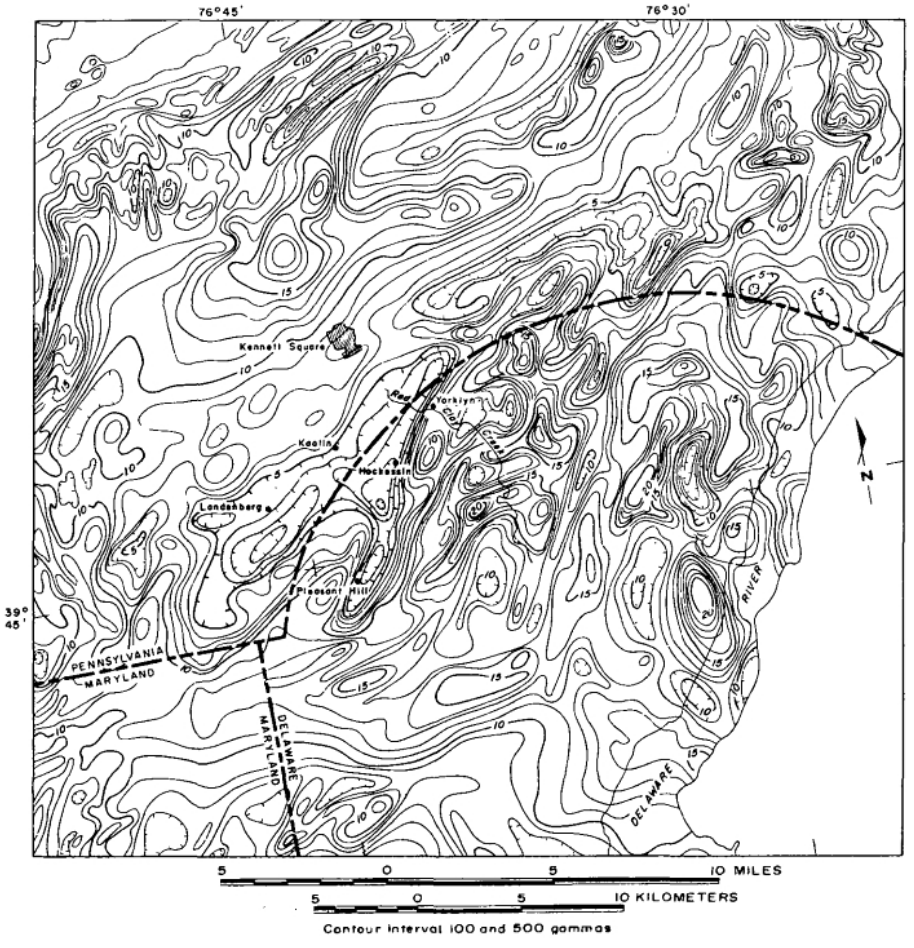


Figure 2. Aeromagnetic map of part of southeastern Pennsylvania, northwestern Delaware, and northeastern Maryland. Deep magnetic low (patterned) approximately outlines Mill Creek dome of Baltimore Gneiss, Setters Formation, and Cockeysville Marble.

Wissahickon Formation with intercalated hornblende gneisses (amphibolites). Bascom and Miller (1920), on the other hand, mapped all the coarse-grained schists and gneisses in this region as Baltimore Gneiss, including large areas of rock now known to be Wissahickon and making no distinction between the older rocks and the overlying Glenarm Series.

The distinctive magnetic expression, coupled with the known outcrops of marble and the recently emphasized fact that the Setters Formation is not everywhere a quartzite or quartz schist (Hopson, 1964; Fisher, 1971), led us to suspect that a dome of Baltimore Gneiss might be present in the area of the magnetic low. Reconnaissance field work has indicated that this is indeed the case.

The marble that crops out in the valley of Pike Creek near Pleasant Hill, Delaware, in the Mill Creek Valley near Hockessin, Delaware, and in the valley of Broad Run southeast of Landenberg, Pennsylvania (all these outcrop areas coincide generally with the gradient at the edges of the deep magnetic low; see Fig. 2), is lithologically identical to parts of the Cockeysville Marble (see Hopson, 1964, p. 69–70). Although outcrops of the marble are few, even in the areas listed above, topography and soils suggest that its distribution is more continuous than shown on existing geologic maps. Feldspathic and micaceous quartz schists that probably belong to the Setters Formation are intermittently exposed adjacent to the marble valleys. The rocks that coincide with the main part of the deep magnetic low (Fig. 2), and apparently lie stratigraphically beneath the quartz schists and marble, are a complex of biotite gneisses and migmatites, with numerous intercalations of coarse-grained amphibolites (Table 1); except for the greater abundance of amphibolites, these rocks are strikingly similar to the Baltimore Gneiss in the Maryland domes (see Hopson, 1964). They are lithologically distinct from the Wissahickon schists and gneisses that are exposed in the area—for example, in the valley of Pike Creek, on the other side of the marble outcrop belt.

CONCLUSIONS

Aeromagnetic data and reconnaissance field work indicate that a previously unknown dome of Baltimore Gneiss is present in southeastern Pennsylvania and northwestern Delaware. The gneiss in the dome appears to be surrounded by a discontinuous outcrop belt of feldspathic and micaceous Setters Formation quartz schists, and these schists, in turn, by a discontinuous outcrop belt of Cockeysville Marble. Wissahickon pelitic schists and gneisses flank the marble. We propose that this dome of Baltimore Gneiss be called the Mill Creek dome, for Mill Creek County, Delaware, which encompasses most of it.

Detailed geologic mapping is still needed to determine the exact distribution of the geologic units associated with the Mill Creek dome and to determine the detailed structure of the dome. The aeromagnetic maps (Henderson and others, 1963; I. Zietz and J.R. Kirby, unpub. data) should prove valuable aids to this mapping.

REFERENCES CITED

Bascom, Florence, and Miller, B.L., 1920, Description of the Elkton-Wilmington quadrangles [Maryland-Delaware-New Jersey-Pennsylvania]: U.S. Geol. Survey Geol. Atlas, Folio 211, 22 p.

Bascom, Florence, and Stose, G.W., 1932, Description of the Coatesville-West Chester quadrangles [Pennsylvania]: U.S. Geol. Survey Geol. Atlas, Folio 223, 15 p.

Bromery, R.W., 1967, Aeromagnetic map of Baltimore County and Baltimore City, Maryland: U.S. Geol. Survey Geophys. Inv. Map GP-613.

Bromery, R.W., Petty, A.J., and Smith, C.W., 1964, Aeromagnetic map of Bel Air and vicinity, Harford, Baltimore, and Cecil Counties, Maryland: U.S. Geol. Survey Geophys. Inv. Map GP-482.

Choquette, P.W., 1960, Petrology and structure of the Cockeysville Formation (pre-Silurian) near Baltimore, Maryland: Geol. Soc. America Bull., v. 71, no. 7, p. 1027–1052.

Eskola, Pentti, 1949, The problem of mantled gneiss domes: Geol. Soc. London Quart. Jour., v. 104, pt. 4, no. 416, p. 461–476.

Fisher, G.W., 1971, Kyanite-, staurolite-, and garnet-bearing schists in the Setters Formation, Maryland Piedmont: Geol. Soc. America Bull., v. 82, no. 1, p. 229–232.

Gray, Carlyle, and others, compilers, 1960, Geologic map of Pennsylvania: Harrisburg, Pennsylvania Geol. Survey, 4th ser., scale 1:250,000.

Henderson, J.R., Johnson, R.W., and Gilbert, F.P., 1963, Aeromagnetic map of the Wilmington, Delaware, area and adjacent parts of Pennsylvania and Maryland: U.S. Geol. Survey Geophys. Inv. Map GP-363.

Higgins, M.W., 1972, Age, origin, regional relations, and nomenclature of the Glenarm Series, central Appalachian Piedmont: A reinterpretation: Geol. Soc. America Bull., v. 83, no. 4, p. 989–1026.

Higgins, M.W., and Fisher, G.W., 1971, A further revision of the stratigraphic nomenclature of the Wissahickon Formation in Maryland: Geol. Soc. America Bull., v. 82, no. 3, p. 769–774.

Hopson, C.A., 1964, The crystalline rocks of Howard and Montgomery Counties, *in* The geology of Howard and Montgomery Counties: Baltimore, Maryland Geol. Survey, p. 27–215.

Knopf, E.B., and Jonas, A.I., 1922, Stratigraphy of the crystalline schists of Pennsylvania and Maryland [abs.]: Geol. Soc. America Bull., v. 33, no. l, p. 110–111.

Knopf, E.B., and Jonas, A.I., 1923, Stratigraphy of the crystalline schists of Pennsylvania and Maryland: Am. Jour. Sci., v. 5, p. 40–62.

McKinstry, Hugh, 1961, Structure of the Glenarm Series in Chester County, Pennsylvania: Geol. Soc. America Bull., v. 72, no. 4, p. 557–578.

Sinha, A.K., Higgins, M.W., Davis, G.L., Hart, S.R., and Kirk, W.S., 1970, The Glenarm Series and related rocks: Carnegie Inst. Washington Year Book 69, p. 412–413.

Southwick, D.L., and Fisher, G.W., 1967, Revision of stratigraphic nomenclature of the Glenarm Series in Maryland: Maryland Geol. Survey Rept. Inv. 6, 19 p.

Tilton, G.R., Wetherill, G.W., Davis, G.L., and Hopson, C.A., 1958, Ages of minerals from the Baltimore Gneiss near Baltimore, Maryland: Geol. Soc. America Bull., v. 69, no. 11, p. 1469–1474.

Wetherill, G.W., Tilton, G.R., Davis, G.L., Hart, S.R., and Hopson, C.A., 1966, Age measurements in the Maryland Piedmont: Jour. Geophys. Research, v. 71, no. 8, p. 2139–2155.

Wetherill, G.W., Davis, G.L., and Lee-Hu, C., 1968, Rb-Sr measurements on whole rocks and separated minerals from the Baltimore Gneiss, Maryland: Geol. Soc. America Bull., v. 79, no. 6, p. 757–762.

Williams, G.H., 1892, Guide to Baltimore, with an account of the geology of its environs (Am. Inst. Mining Engineers, Baltimore mtg., 1892): Baltimore, J. Murphy and Co., 139 p.

ACKNOWLEDGMENTS

L.C. Pakiser reviewed the manuscript. J.R. Kirby assisted in valuable discussions related to the aeromagnetic map. Publication authorized by the Director, U.S. Geological Survey.

Original Geology *manuscript received 26 Feb. 1973; manuscript accepted 3 July 1973.*

AMERICAN MUSEUM OF NATURAL HISTORY

Richard Gilder Graduate School

Master of Arts in Teaching

Change lives. Teach science.

Join a fully paid master's degree program in Earth and space science that prepares you to teach in high-need middle and high schools in New York City and New York State.

Learn to teach from experienced education faculty and residency mentors. Study and conduct research alongside renowned Museum scientists.

Apply Today!

You're invited to an open house, or an upcoming webinar, at the Museum. Complete details are available at **amnh.org/mat**

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

Leadership support for the MAT program is provided by The Shelby Cullom Davis Charitable Fund.

The MAT program is supported in part by the New York State Education Department, the National Science Foundation under Grant Numbers DRL-1119444 and DUE-1340006, and the U.S. Department of Education under Grant Number U336S140026.

amnh.org/mat mat@amnh.org | 212-313-7464 | @amnh | facebook.com/amnhmat

1–4 NOVEMBER

GSA 2015

Baltimore, Maryland, USA

Reminders

- **Last day to cancel hotel room reservations without a penalty:** 20 September
- **Apply for a Student Travel Grant** by 28 September
- **Sign up for** a Short Course or Field Trip when you register
- **GSA student members:** Sign up to work for at least ten hours at the meeting as a student volunteer and receive complimentary full meeting registration, as well as a US$25 stipend for every five hours that you work.

Early Registration Deadline: 28 September

THE GEOLOGICAL SOCIETY OF AMERICA®

community.geosociety.org/gsa2015

Photos courtesy of Visit Baltimore.

Contents

GSA 2015 | BALTIMORE, MARYLAND, USA

Photo courtesy of Visit Baltimore.

President's **Welcome**

Jonathan G. Price

Please join your colleagues at the GSA 2015 Annual Meeting in Baltimore, on 1–4 November. It promises to be a superb experience for geoscientists. Our return to the East Coast will feature outstanding field trips to classic sites in the Appalachians, piedmont, and Atlantic coastal plain; short courses designed to enhance professional development in research, applied geology, and teaching; technical sessions covering forefronts in our science; an exhibit hall with a mixture of scientific posters, publishers, equipment and service vendors, geoscience organizations, and graduate schools; and special presentations.

Among the highlights will be a two-day Pardee symposium honoring the 200th anniversary of the publication of the first modern geologic map of a large region—England, Wales, and portions of Scotland—by William Smith (see p. 39). His map had direct implications for our science as well as for the development of water and mineral resources, and GSA sessions will highlight how our science has expanded on the foundation that Smith built. We will also be celebrating the first GSA Geologic Mapping Award in Honor of Florence Bascom, a pioneer in North American geology. Other highlights include a special session on the 25 April 2015 Nepal earthquake and new "Feed Your Brain" lectures scheduled during lunch breaks Mon.–Wed.

Our Baltimore event will also host the second joint meeting of GSA and the Geological Society of China. Called a "meeting within a meeting," it will take place on Sun.–Mon., 1–2 Nov., and features a three-day pre-meeting field trip studying the North American Cordillera.

All this, coupled with the extraordinary setting of the Baltimore–Chesapeake Bay area, make this an event not to miss.

GSA President ***Jonathan G. Price,*** *Jonathan G. Price LLC*

Organizing **Committee**

GENERAL CHAIR
David A. Vanko, Towson University, dvanko@towson.edu

TECHNICAL PROGRAM CHAIR
Patrick Burkhart, Slippery Rock University, patrick.burkhart@sru.edu

FIELD TRIP CHAIR
Richard A. Ortt, Jr., Maryland Geological Survey, richard.ortt@maryland.gov

FIELD TRIP CO-CHAIRS
David K. Brezinsky, Maryland Geological Survey, DBrezinski@dnr.state.md.us

Jeffrey P. Halka, Maryland Geological Survey, jeff.halka@maryland.gov

SPONSORSHIP CHAIR
David A. Vanko, Towson University, dvanko@towson.edu

K–12 EDUCATION CHAIR
Michael Passow, Lamont-Doherty Earth Observatory of Columbia University, michael@earth2class.org

SPECIAL EVENTS CHAIR
Michael S. Kelley, NASA Headquarters, Michael.S.Kelley@nasa.gov

STUDENT COMMITTEE
Hannah Susorney, Johns Hopkins University, hsusorn1@jhu.edu

Sophie Lehmann, Johns Hopkins University, slehman4@jhu.edu

Medal & Award Recipients


James W. Head


Jerry X. Mitrovica


Brandon Schmandt


Steven Squyres


Naomi Oreskes


Dawn J. Wright


Jack Hess


Priya Ganguli


John M. Proffett


Rodney C. Ewing

PENROSE MEDAL
James W. Head, Brown University

ARTHUR L. DAY MEDAL
Jerry X. Mitrovica, Harvard University

YOUNG SCIENTIST AWARD (DONATH MEDAL)
Brandon Schmandt, University of New Mexico

PRESIDENT'S MEDAL OF THE GEOLOGICAL SOCIETY OF AMERICA
Steven Squyres, Cornell University

GSA PUBLIC SERVICE AWARD
Naomi Oreskes, Harvard University

RANDOLPH W. "BILL" AND CECILE T. BROMERY AWARD FOR MINORITIES
Dawn J. Wright, Environmental Systems Research Institute

GSA DISTINGUISHED SERVICE AWARD
John W. "Jack" Hess, Geological Society of America Foundation

DORIS M. CURTIS OUTSTANDING WOMAN IN SCIENCE AWARD
Priya Ganguli, Woods Hole Oceanographic Institution

GEOLOGIC MAPPING AWARD IN HONOR OF FLORENCE BASCOM
John M. Proffett, Independent Consulting Geologist

AGI MEDAL IN MEMORY OF IAN CAMPBELL
Rodney C. Ewing, Stanford University

Awards Ceremony


PRESIDENT
Jonathan Price

Please join GSA President **Jonathan Price** and GSA Vice President/President-Elect **Claudia Mora** to honor and greet the 2015 GSA Medal & Award recipients at the GSA Presidential Address and Awards Ceremony on Sun., 1 Nov, noon–1:30 p.m., at the Baltimore Convention Center. At this year's combined event, you will also have the privilege of hearing Price give his Presidential Address, "*The World is Changing.*" Following his address, **Vicki McConnell**, Executive Director of GSA, will provide a presentation on the state of the Society, and **Jack Hess** will provide a GSA Foundation update. *All are welcome*; no reservations, tickets, or meeting registration required.


VICE PRESIDENT/ PRESIDENT ELECT
Claudia Mora

Presidential Address & Awardee Lectures

GSA Presidential Address

Jonathan G. Price
Sun., 1 Nov., noon–1:30 p.m.
Baltimore Convention Center (BCC), Room 327/328/329

The World is Changing

The future is bright for the geosciences from many perspectives. Our science is increasingly global as we recognize the challenges of understanding interconnected Earth systems—meeting the rising global demand for mineral and energy resources, handling tradeoffs regarding sustainable development, and reducing risks of natural disasters that impact the global economy. The geosciences are vital to meeting these societal challenges. We geoscientists are changing demographically, and GSA's world is changing as well, to the benefit of our members, authors, the general public, and science. Our rigorously peer-reviewed and edited journals are becoming freely accessible on the Web. GSA's dimensions are growing!

President's Medal Lecture

Steven W. Squyres

Robotic Field Geology

Technological advances now allow meaningful geologic exploration of a planet's surface to be carried out robotically. Robotic field geology, however, requires new techniques and processes that are not common to traditional field geology. Robotic systems on distant planets suffer from many limitations, including limited mobility, tightly constrained data bandwidth to Earth, modest capabilities for manipulating geologic materials, and long operational latencies. The challenge of robotic field geology is to overcome these limitations by exploiting the unique strengths that robotic vehicles possess. These strengths include scientific instrumentation that is not normally available to a field geologist and the ability to harness the efforts of a large and experienced team of scientists to make operational decisions. The Mars Exploration Rover Project has developed a set of techniques and procedures that have enabled effective field geology to be carried out on the martian surface. This talk will review how these techniques and procedures were first developed, and describe how they have been put to use for more than eleven years of exploration by the robots *Spirit* and *Opportunity*.

James W. Head

Jerry X. Mitrovica

Brandon Schmandt

GSA Gold Medal Lectures

GSA continues the celebration with lectures by our three gold medalists: **James Head,** Penrose Medal; **Jerry Mitrovica,** Day Medal; and **Brandon Schmandt,** Donath Medal. These lectures will be held in the Baltimore Convention Center in appropriate technical sessions; dates and times to be announced. Each medalist will present a 20-minute talk reflecting the science of their careers:

Head: "Planetary Evolution: A Geologic Perspective"

Mitrovica: "Sea-Level Change from the Paleozoic to the 21st Century: A Record of Controversy"

Schmandt: "Multi-Scale Mapping of the North America Mantle and Crust with Seismology"

Registration

Early registration deadline: 28 September

Cancellation deadline: 5 October

Register online now at **community.geosociety.org/gsa2015/registration**

REGISTRATION FEES

(in U.S. dollar)

	EARLY	STANDARD/ ONSITE
	(June–28 Sept.)	(after 28 Sept.)
Professional member, full meeting	$365	$445
Professional member, one day	$235	$265
Professional member 70+, full meeting	$265	$350
Professional member 70+, one day	$165	$190
Professional non-member, full meeting	$490	$560
Professional non-member, one day	$305	$325
Student member, full meeting	$120	$155
Student member, one day	$75	$85
Student non-member, full meeting	$160	$195
Student non-member, one day	$100	$110
High-school student	$40	$40
K–12 professional, full meeting	$55	$65
Field Trip or Short Course only	$40	$40
Guest or spouse	$85	$90
Low income country*	50%	50%

*Participants from countries classified as "Low or Lower Middle Income Economies" by the World Bank need only pay 50% of the category fee for full meeting or one day registration. Online registration is not available for "Low or Lower Middle Income Economy" registrants. Please fill out a hardcopy version of the registration form and mail it to GSA, P.O. Box 9140, 3300 Penrose Place, Boulder, CO, 80301-9140, USA.

Student Travel Fund

Interested in helping students participate in the meeting?

Donate to the Student Travel Fund on your registration! Every year, a large percentage of students apply for travel grants but do not receive an award due to a limited number of funds. You can help increase the number of students helped by donating as little as US$10 via your registration form. 100% of the monies collected go to students.

Don't forget to...

- ✓ Register for tours, special events, field trips, and workshops;
- ✓ Purchase your tickets and/or register in advance for special events;
- ✓ Bring a copy of your meeting confirmation with you;
- ✓ Be sure to apply for the Student Travel Grant program by 28 Sept.;
- ✓ Make your hotel reservation; and
- ✓ Book your travel.

Events Requiring Tickets/Advance Registration

Several GSA Divisions and Associated Societies will hold breakfasts, lunches, receptions, and awards presentations that require a ticket and/or advance registration. Tickets can be purchased when you register or at the on-site registration desk up to 48 hours prior to the event. If you are not attending the meeting but would like to purchase a ticket to one of these events, please contact meetings@geosociety.org.

Student Members: Volunteer *Before You Register*

Earn FREE meeting registration when you volunteer for ten hours, PLUS one US$25 stipend for every five hours worked, PLUS get an insider's view of the meeting! Sign up early for the best selection of jobs, then register as a student volunteer.

Continuing Education Credits (CEUs)

The Annual Meeting offers you an excellent opportunity to earn CEUs just for attending technical sessions, taking short courses, or going on field trips. Ten contact hours are required for one CEU; for example, one day (8 hours) of technical sessions = 0.8 CEUs. After the meeting, contact William Cox at wcox@geosociety.org for a meeting evaluation form; return the form, and you'll receive your CEU certificate within two weeks.

Special Requirements

GSA strives to create a pleasant and rewarding experience for every attendee. Let us know in advance of the meeting if you have needs that require further attention. Most dietary considerations can be met without any extra charge. Be sure to check the appropriate box when registering online and a GSA staff member will contact you.

Travel & Transportation

Getting to Baltimore

BY AIR

Southwest Airlines is GSA's official conference airline, and discounted pricing can be booked at https://www.swabiz.com/flight/search-flight.html?cid=99343650.

Baltimore is served by three major airports:

(1) **Baltimore/Washington International Thurgood Marshall Airport** (BWI; www.bwiairport.com) in Maryland, just 15 min. from downtown Baltimore;

(2) **Washington Dulles International Airport** (www.metwashairports.com/dulles/dulles.htm) in northern Virginia; and

(3) **Ronald Reagan Washington National Airport** (www.metwashairports.com/reagan/reagan.htm), also in northern Virginia. Check each airport's website for ground transportation information.

BY TRAIN

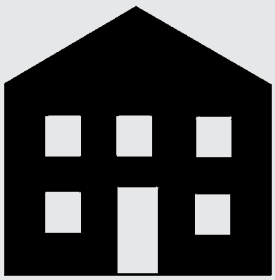
Baltimore is easily accessible by train (and is within driving distance of more than one-third of the nation's population). Erected in 1911, Baltimore's Penn Station is a major stop for **Amtrak's high-speed Acela Express service.** Learn more at **www.amtrak.com.** Penn Station is about three miles from the convention center.

Commuter rail service is provided by the **MARC Train.** Local areas served include Baltimore; Washington D.C.; and Martinsburg, West Virginia. Most MARC Train service lines operate Mon.–Fri., but weekend service is provided on the Penn Line, which includes Baltimore/Washington International Thurgood Marshall Airport. Learn more at **www.mtamaryland.com.**

Getting Around

PUBLIC TRANSPORTATION

The Maryland Transit Administration (MTA) operates bus, metro subway, light rail, and MARC train services. For fares and schedules, please call +1-888-218-2267 (locally, +1-410-539-5000) or go to www.mtamaryland.com. The **Charm City Circulator** (**www.charmcitycirculator.com**) is a free transportation service with four routes that intersect downtown Baltimore, including a route to Fort McHenry National Monument and Historic Shrine. Shuttles run every 10 min. from early morning to late at night, seven days a week. The routes also connect to other forms of transit, such as the light rail, MARC, the metro subway, and the Baltimore Water Taxi.



Roommates & Rides

Use this service to connect with other meeting attendees and talk about whatever you want, whenever you want. Meet new people, coordinate your schedules, and plan activities. You can even save money by sharing travel and lodging expenses. It's easy and it's free! To access the secure Web page, go to the meeting website (**community.geosociety.org/gsa2015/**) and click on "Attendee Info" and "Find a Roommate."

Notice of GSA Council Meetings

GSA 2015 ANNUAL MEETING & EXPOSITION BALTIMORE, MARYLAND, USA

Two meetings of GSA's Council will be held at the Hilton Baltimore during the meeting.

DAY 1: Sat., 31 Oct., 8 a.m.–noon, Holiday Ballroom 4 (2nd floor)

DAY 2: Wed., 4 Nov., 8 a.m.–noon, Johnson Room (1st Floor)

All GSA members are invited to attend the open portions of these meetings.

THE GEOLOGICAL SOCIETY OF AMERICA®

Accommodations

Geological Society of America

1-4 Nov. 2015 | Baltimore, Maryland, USA

VisitBaltimore

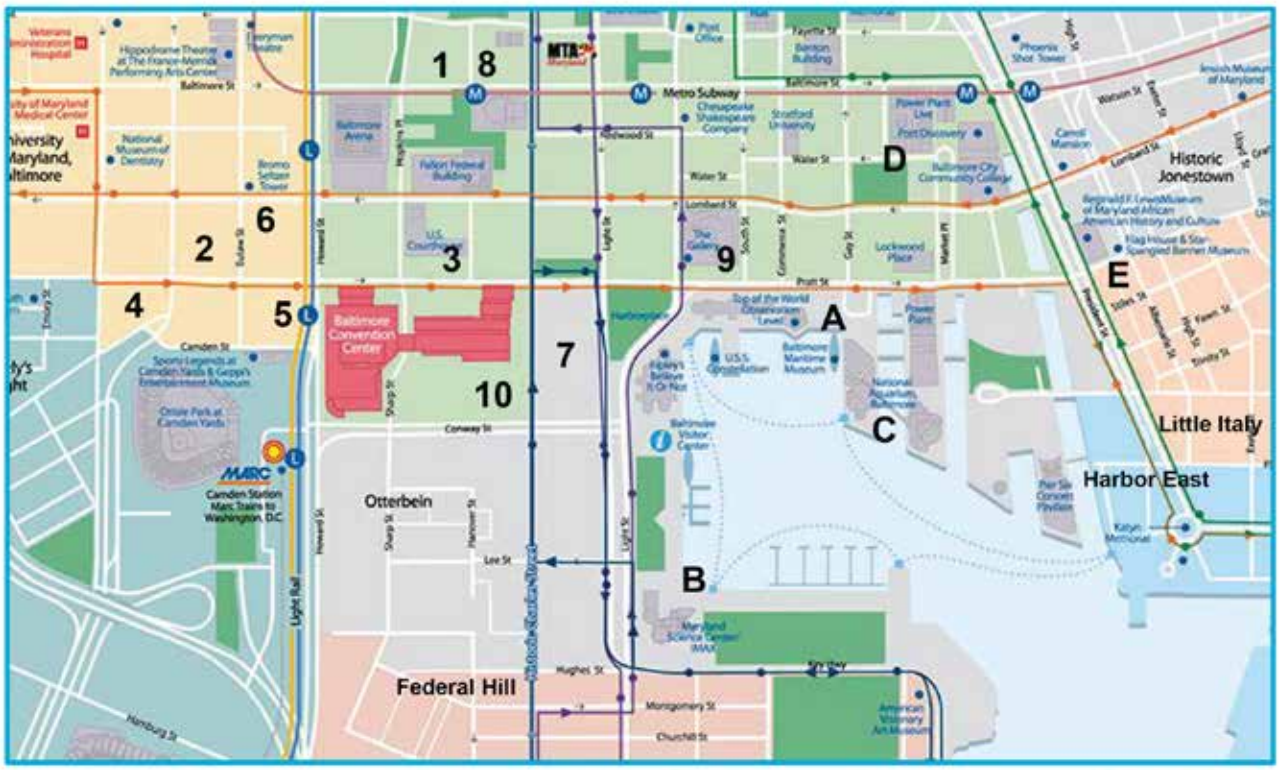
Hotels

1. Baltimore Harbor Hotel
2. Baltimore Marriott Inner Harbor at Camden Yards
3. Days Inn Inner Harbor
4. Hampton Inn Downtown/Convention Center
5. Hilton Baltimore, Headquarters Hotel
6. Holiday Inn Inner Harbor
7. Hyatt Regency Baltimore
8. Lord Baltimore Hotel
9. Renaissance Harborplace Hotel
10. Sheraton Inner Harbor

Local Attractions

A. Baltimore Maritime Museum
B. Maryland Science Center
C. National Aquarium
D. Power Plant Live!
E. Flag House Star-Spangled Banner Museum

- Metro Line
- Light Rail
- MARC Train
- Water Taxis
- Visitors Center
- Charm City Circulator - Green Route
- Charm City Circulator - Orange Route
- Charm City Circulator - Purple Route
- Charm City Circulator - Banner Route



Accommodations continued

Critical Dates

20 SEPT.: Last day to cancel rooms without a penalty.

28 SEPT.: Room rates are guaranteed as long as there are rooms available in the GSA room block.

AFTER 28 SEPT.: Hotel rates and/or availability cannot be guaranteed.

22 OCT.: Deadline for all changes, cancellations, and name substitutions—finalized through Visit Baltimore/GSA Housing.

23 OCT.: Beginning on this date, you must contact the hotel directly for all changes, cancellations, and new reservations.

Once you receive your hotel acknowledgment and have booked your travel, please review your hotel arrival/departure dates for accuracy. If you do not show up on the date of your scheduled arrival, the hotel will release your room and you will be charged for one night's room and tax. If you have travel delays and cannot arrive on your scheduled arrival date, contact the hotel directly with the new arrival information.

Childcare
by KiddieCorp

KiddieCorp is providing child care services for GSA attendees Sat.–Wed., 7 a.m.–6 p.m. The program is open to children six months to 12 years old and costs US$9 per hour per child (two hour min.). Register at **community.geosociety.org/gsa2015/attendeeinfo/childcare** by 2 Oct.

Guest Program

Take advantage of the Penrose Guest Hospitality Suite that is available to all registered guests. The suite is the perfect place to relax, have a cup of coffee, and catch up with friends. As a registered guest, you will have access to the Exhibit Hall and be able attend your companion's technical session(s). We will also have seminars on "The Art of Crab Cracking" on Monday and "The Life & Writings of Edgar Allen Poe" on Wednesday. *See you in Baltimore!*

Local Tours

To get the most out of the Baltimore area, it's valuable to have an experienced and knowledgeable tour guide to assist you. Our groups are small and provide guests with an opportunity to ask questions and get off the beaten path. All tours require a minimum number of participants—please sign up for your tour by the early registration deadline of 28 September.

101. **Baltimore Art Museums with City Tour:** Sun., 1 Nov., 9:30 a.m.–2:30 p.m. Cost: US$135 (includes box lunch).

102. **Baltimore's Historic Churches:** Mon., 2 Nov., 8:30 a.m.–12:30 p.m. Cost: US$50.

103. **Foodie Tour of Little Italy:** Mon., 2 Nov., 1–4 p.m. Cost: US$88 (walking tour—no transportation provided).

104. **Whirlwind Tour of Washington D.C. with Lunch at the Occidental:** Tues., 3 Nov., 8:30 a.m.–3:30 p.m. Cost: US$150.

105. **Baltimore Architecturally Speaking:** Tues., 3 Nov., 1–5 p.m. Cost: US$60.

106. **Star-Spangled Baltimore:** Wed., 4 Nov., 8:30 a.m.–3:30 p.m. Cost: US$165 (includes box lunch).

107. **Jewel of the Chesapeake:** Wed., 4 Nov., 8:30 a.m.–3:30 p.m. Cost: US$165 (includes lunch).

At-a-Glance

Pre-meeting Field Trips and Short Courses, along with a variety of business meetings, will take place between Wed., 28 Oct., and Sat., 31 Oct.

Saturday

ICEBREAKER
Baltimore Convention Center, 5–7 p.m.
The Saturday Icebreaker reception is the most popular event at the Annual Meeting. Join thousands of industry professionals, students, academics, and GSA Division and Associated Society Members to kick off the Annual Meeting with beer and great company.

Sunday

(Note: *Daylight saving time ends*)

- Bridging Two Continents: 8 a.m.–5:30 p.m.
- Oral Technical Sessions: 8 a.m.–noon
- Poster Sessions: 9 a.m.–5:30 p.m.
- Lunch Break: noon–1:30 p.m.
- GSA Presidential Address & Awards Ceremony: noon–1:30 p.m.
- Oral Technical Sessions: 1:30–5:30 p.m.
- Exhibits Open: 2–7 p.m.
- Exhibit Opening Reception: 5:30–7 p.m.

Monday

- Bridging Two Continents: 8 a.m.–5:30 p.m.
- Oral Technical Sessions: 8 a.m.–noon
- Poster Sessions: 9 a.m.–6:30 p.m.
- Exhibits: 9 a.m.–6:30 p.m.
- Lunch Break: noon–1:30 p.m. (Feed Your Brain speaker: James Balog [see p. 29])
- Oral Technical Sessions: 1:30–5:30 p.m.
- Afternoon Beer Reception: 4:30–6:30 p.m.
- Alumni Receptions: evening hours

Tuesday

- Oral Technical Sessions: 8 a.m.–noon
- Poster Sessions: 9 a.m.–6:30 p.m.
- Exhibits: 9 a.m.–6:30 p.m.
- Lunch Break: noon–1:30 p.m. (Feed Your Brain speaker: Marcia McNutt [see p. 29])
- Oral Technical Sessions: 1:30–5:30 p.m.
- Afternoon Beer Reception: 4:30–6:30 p.m.

Wednesday

- Oral Technical Sessions: 8 a.m.–noon
- Poster Sessions: 9 a.m.–6:30 p.m.
- Exhibits: 9 a.m.–2 p.m.
- Lunch Break: noon–1:30 p.m. (Feed Your Brain speaker: Ellen Stofan [see p. 29])
- Oral Technical Sessions: 1:30–5:30 p.m.
- Afternoon Beer Reception: 4:30–6:30 p.m.

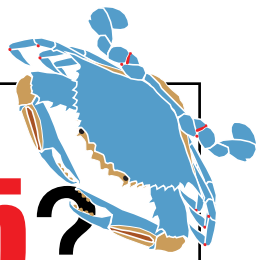
Post-meeting field trips run from Wed., 4 Nov., through Fri., 6 Nov.

COFFEE

Your caffeine fix is complimentary in the mornings (while supplies last!) in the Baltimore Convention Center.
Sun., 1 Nov., 9:30 a.m., Exhibit Hall (poster area)
Mon.–Wed., 2–4 Nov., 9:30 a.m., Exhibit Hall
Coffee will also be available for purchase at the Market Fresh Café and the Starbucks located off of the Pratt Street Lobby on the 300 level of the convention center.

BEER

Be a part of our Brew Crew! Beer receptions are as follows:
Sun., 1 Nov., 5:30–7 p.m., Exhibit Hall Opening Reception
Mon.–Wed., 2–4 Nov., 4:30–6:30 p.m., Exhibit Hall (great time to meet with poster presenters).



Want more
GSA 2015?

2015 ANNUAL MEETING GEAR

Get your 2015 swag here!
Limited-edition pint glasses and growlers are already on sale to commemorate the Baltimore meeting at **community.geosociety.org/gsa2015/social-business/gear.** Get them while they last, and make sure to check out the discount offered at Pratt Street Ale House. If brews aren't your swag style, check out our customized apparel, all available online now!

Joseph Thomas Pardee (1871–1960)

Pardee **Keynote Symposia**

Pardee Keynote Symposia are named in honor of GSA Fellow and benefactor Joseph Thomas Pardee (1871–1960) via a bequest from Mary Pardee Kelly. These symposia consist of invited presentations covering a broad range of topics.

Sunday

P1. Celebrating the Genius of William "Strata" Smith: Bicentennial Anniversary of Smith's Revolutionary Map. Parts I and II.

8 a.m.–4 p.m., Baltimore Convention Center (BCC) Room 327/328/329.

Conveners: George H. Davis, Renee Clary, and Suzanne O'Connell.

Smith's 1815 *A Delineation of the Strata of England and Wales with Part of Scotland* stands as a milestone in the geological sciences. Smith's genius influenced geology's formative period, and beyond. This session will explore "Smith" fundamentals in relation to our science today. See p. 38–40 for more about Smith and to view a copy of his map.

Monday

P1. Celebrating the Genius of William "Strata" Smith: Bicentennial Anniversary of Smith's Revolutionary Map. Part III.

8 a.m.–noon, BCC Room 327/328/329.

Conveners: George H. Davis, Renee Clary, and Suzanne O'Connell.

This is a continuation of the Sunday session.

P2. Savor the Cryosphere.

1:30–5:30 p.m., BCC Room 327/328/329.

Conveners: Patrick Burkhart, Greg Baker, and Paul Baldauf.

This session will be the ultimate colloquium for 2015 that examines the retreat of glaciers on Earth, coupled to the perturbation of other Earth systems by an intensely warming climate. Three prestigious investigators seek to demonstrate that "seeing is believing." The program includes a screening of *Chasing Ice*, coupled with a panel discussion and Q&A. The panel features James Balog (Extreme Ice Survey), Richard Alley (*The Two-Mile Time Machine: Ice Cores, Abrupt Climate Change, and Our Future*), and Lonnie Thompson (tropical ice in South America, Africa, and Asia).

Tuesday

P3. Earth-Life Systems at the Dawn of Animals.

8 a.m.–noon, BCC Room 327/328/329.

Conveners: James D. Schiffbauer, Marc Laflamme, and Simon A.F. Darroch.

Geobiologists, evolutionary biologists, paleontologists, sedimentologists, geochemists, and earth-systems scientists will be brought together to showcase high-impact research, identify the frontiers of current research, and present key questions to be addressed in future prospects on the rise of animals across the Precambrian–Cambrian transition.

P4. Similar Information, Different Results: Fracking from State to State.

1:30–5:30 p.m., BCC Room 327/328/329.

Conveners: R. Laurence Davis and Christopher P. Carlson.

Using similar data, different states have formulated very different approaches to addressing oil and gas recovery from shale plays using hydrofracking. During this session, geologists and policy makers representing several states will outline their states' policies and discuss how they were developed. The presentations will be followed by a panel discussion about approaches to formulating policy for controversial issues along with time for questions and discussion with the audience.

Wednesday

P5. Appalachian Geomorphology, Parts I and II.

8 a.m.–5:30 p.m., BCC Room 327/328/329.

Conveners: Frank J. Pazzaglia, Gregory S. Hancock, and Sean F. Gallen.

This full-day session is dedicated to new research and synoptic presentations of geomorphic processes and rates as seen through the lens of the Appalachian landscape, the spawning ground of the great paradigms championed by Davis and Hack. The session will continue the discussion started during pre-meeting field trips also devoted to the topic of Appalachian geomorphology and will be linked to a topical session with a similar focus. Session leaders envision addressing topics including, but not limited to, dynamic uplift, fluvial incision, drainage network steadiness, rates and processes of erosion, hillslope and periglacial processes, and soils.

Technical Sessions

Speaker Ready Room

Baltimore Convention Center, Room 333

Sat., 31 Oct., 8 a.m.–8 p.m.

Sun.–Tues., 1–3 Nov., 6:30 a.m.–6:30 p.m.

Wed., 4 Nov., 6:30 a.m.–1:30 p.m.

We highly recommend that all speakers visit the speaker ready room for an opportunity to run through their presentations and get comfortable with the equipment. Highly qualified technicians are on-hand to offer assistance.

To submit your presentation prior to the meeting (deadline: 11:59 p.m. EDT, 28 Oct.), please upload to the Conference Exchange Web site at http://gsa.confex.com/gsa/extra.cgi. You will need to know your abstract ID (see your abstract acceptance notification) and password. Your abstract acceptance e-mail will also include the time and location of your presentation as well as whether you've been slated for a talk or a poster. You can also withdraw your presentation via this site.

If you are unable to submit your presentation prior to the meeting, please do so in the speaker ready room the day before your presentation, following this schedule:

If your Presentation is on	Upload no later than
Sunday	8 p.m., Saturday, 31 Oct.
Monday	6:30 p.m., Sunday, 1 Nov.
Tuesday	6:30 p.m., Monday, 2 Nov.
Wednesday	6:30 p.m., Tuesday, 3 Nov.

If you have a Sunday presentation and are unable to get to the speaker ready room on Saturday, please take your presentation directly to your session room at least 30 minutes before the session is scheduled to begin.

Acceptable file types: PowerPoint (.ppt or .pps), Microsoft Word (.doc), or PDF (.pdf). If your graphics or video clips are not embedded in your presentation, please be sure that you bring them as well.

Mac users: We strongly recommend that you test your Mac-produced presentation on a Windows-based system before coming to the meeting. Make sure that the hyperlinks still function, and avoid using a rewritable CD (CD-RW), as we've encountered compatibility problems with them. If your presentation includes embedded video, your video will most likely NOT play automatically on the PC platform. You will need to convert your .mov files to .avi format or create a link in your slide show to an external .mov file. If you choose the latter, your animation will play in a separate QuickTime window, outside of your PowerPoint presentation. If you are unable to run your Mac presentation from a PC, we will be able to accommodate you; please talk to the technicians in the Speaker Ready Room for more information.

Baltimore Meeting App

GSA has a new meeting app that can be used in two ways: (1) Install it as a native app on iOS or Android phones and tablets, and you can browse and search the entire meeting even without an Internet connection; (2) As a Web app, this responsively designed application will run on any Web browser and work well on screens of any size. The app will help you build your own schedule for the meeting, and that schedule will sync with all of the devices on which you run the app. This way, you can start planning for the meeting using the Web app and then continue using the app on your smartphone or tablet while in Baltimore.

The Web app is available this month (early to mid-September). Native apps will be available in the Apple Store and Play Store in early October. If your mobile device is short on memory and you would prefer not to install the native app, and if you have a good cellular data plan just in case you encounter Wi-Fi problems at the meeting, we recommend that you use the Web app on your phone.

For more information and download links go to **community.geosociety.org/gsa2015.**

Includes the Entire Technical Program

- Locate the sessions and individual talks you want to hear, and add them to your personal schedule;
- See who is exhibiting and add them as favorites;
- Find speakers and add them as contacts;
- Select events to attend and add them to your calendar; and
- View uploaded presentations.

Everything you need to know about the meeting, always at your fingertips!

1-4 NOVEMBER
GSA 2015
Baltimore, Maryland, USA

BRIDGING TWO CONTINENTS

A joint meeting between the Geological Society of China and the Geological Society of America held in conjunction with the GSA 2015 Annual Meeting

THE GEOLOGICAL SOCIETY OF AMERICA®

You are invited to participate in the *Bridging Two Continents* portion of the GSA 2015 meeting in Baltimore. This "meeting within a meeting" will be held on Sunday and Monday, 1–2 November, at the Baltimore Convention Center. Topical Sessions T1–T8 are part of the *Bridging Two Continents* meeting and are open to all GSA attendees.

An additional highlight of this meeting will be the ticketed luncheon on Monday, featuring a keynote address by James Hansen, "Ice Melt, Sea-Level Rise & Superstorms: Finding a Realistic Pathway to Clean Energy and Stable Climate."

James Hansen

Bridging Two Continents Luncheon with Featured Keynote Speaker James Hansen

Ice Melt, Sea-Level Rise & Superstorms: Finding a Realistic Pathway to Clean Energy and Stable Climate

Mon., 2 Nov., noon–1:30 p.m.

This luncheon is open to any attendee who purchases a ticket (US$50), and thanks to a generous contribution, the first 25 students who want to attend can register for US$25 each.

Speaker James Hansen retired as director of the NASA Goddard Institute for Space Studies in 2013. He now serves as an adjunct professor at Columbia University's Earth Institute, where he directs the "Climate Science, Awareness and Solutions" program. His talk will cover the current understanding of the human-made climate change that is now under way and the most important implications of that change for humanity and other species. The talk will also evaluate the changes in the global energy pathway required to stabilize climate and the economically realistic pathways to achieving carbon-free energy soon enough to avoid disastrous consequences for young people. Hansen notes that the present situation constitutes a global crisis that calls for international scientific and engineering cooperation, most particularly between China and the United States.

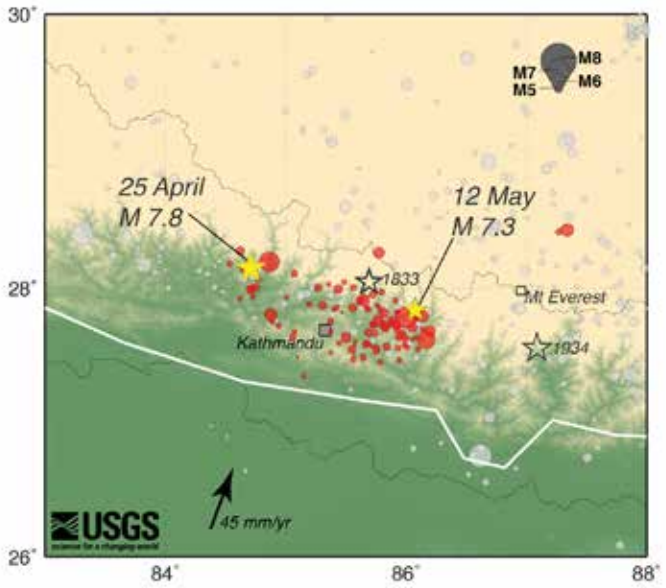
Special **Session**

Nepal (Gorkha) Earthquake

Mon., 2 Nov. Oral and Poster.

Conveners: Anke M. Friedrich; Elizabeth J. Catlos.

This session focuses on the devastating M_W 7.8 earthquake in Nepal on 25 April 2015, which killed more than 9,000 people and injured more than 23,000. It was the worst natural disaster to strike Nepal since 1934. The earthquake also triggered an avalanche on Mount Everest, making 25 April 2015 the deadliest day on the mountain in climbing history. An M_W 7.3 aftershock followed on 12 May 2015.



Map courtesy USGS: http://www.usgs.gov/blogs/features/usgs_top_story/magnitude-7-8-earthquake-in-nepal/.

Best Student Geologic **Map Competition**

The U.S. Geological Survey National Cooperative Geologic Mapping Program, in partnership with GSA, the GSA Foundation, the Association of American State Geologists, the American Geosciences Institute, the American Institute of Professional Geologists, and the *Journal of Maps* invites you to stop by to view the third annual Best Student Geologic Map Competition.

The competition highlights student research from around the world that utilizes field mapping and the creation of geologic maps as a major component. The top three maps will be selected for recognition and awards at a special judging reception. Students will post their maps (session posters) on Tues., 3 Nov., as early as 9 a.m. and will be present from 5–6:30 p.m. in the Poster Hall for review and evaluation by the judges.

Scientific **Field Trips**

Descriptions and leader bios are online.

Plan now to take advantage of these amazing trips as part of your GSA 2015 experience. Please contact the trip leaders directly if you have questions about trip details (check online for more information). All trips begin and end at the Baltimore Convention Center unless otherwise indicated. Trip fees include transportation during the trip (unless otherwise noted); other services, such as meals and lodging, are noted with each trip (see key).

Thanks to generous support from ExxonMobil, 10 field trips are being offered at a discounted rate for students (these trips are denoted with an asterisk). Registration for each trip is on a first-come, first-served basis, and discounted student space is limited.

ExxonMobil

PRE-MEETING

401. Holocene Barrier Island Geology and Morphodynamics along the Maryland and Virginia Open-Ocean Coasts: Fenwick, Assateague, Chincoteague, Wallops, Cedar, and Parramore Islands.

Wed.–Sat., 28–31 Oct. US$475 (2B, 4L, 1D, R, 3ON). **Leaders:** Randolph A. McBride, George Mason University; Michael S. Fenster; Christopher Seminack. **Cosponsors:** *GSA Sedimentary Geology Division; GSA Quaternary Geology and Geomorphology Division.*

402. Geomorphology, Active Tectonics, and Landscape Evolution in the Mid-Atlantic Region.*

Wed.–Sat., 28–31 Oct. US$425 (3L, 2D, R, 3ON). *Limited student price: US$300. **Leaders:** Frank J. Pazzaglia, Lehigh University; Mark W. Carter; Gregory S. Hancock; David J. Harbor; G. Richard Whittecar; Paul Bierman; James A. Spotila. **Cosponsor:** *GSA Quaternary Geology and Geomorphology Division.*

403. From the Freezer to the Fire: Neoproterozoic Tectonics, Glaciation, and Volcanism in the Central Appalachian Blue Ridge Province.*

Thurs.–Sat., 29–31 Oct. US$275 (2L, R, 2ON). *Limited student price: US$140. **Leaders:** Christopher Bailey, College of William & Mary; Callan Bentley; Scott Southworth; Alan J. Kaufman. **Cosponsors:** *GSA Structural Geology and Tectonics Division; GSA Sedimentary Geology Division; EGU Structural Geology & Tectonics Division.*

404. William Smith's Map and Other Treasures of the History of Geology at the Academy of Natural Sciences, American Philosophical Society, and Library Company, Philadelphia.

Fri., 30 Oct. US$99 (1B, 1L, R). **Leaders:** Gary D. Rosenberg, Indiana University–Purdue University; Sally Newcomb; Hugh Torrens. **Cosponsor:** *GSA History and Philosophy of Geology Division.*

405. Paul S. Sarbanes Ecosystem Restoration Project at Poplar Island.

Fri., 30 Oct. US$85 (1L). **Leaders:** Justin Callahan, U.S. Army Corps of Engineers, Baltimore District; Maria Orosz. **Cosponsors:** *U.S. Army Corps of Engineers, Baltimore District; Maryland Port Administration; Maryland Environmental Service.*

407. Cambrian-Ordovician of the Central Appalachians: Correlations and Event Stratigraphy of Carbonate Platform and Adjacent Deep-Water Deposits.*

Fri.–Sat., 30–31 Oct. US$220 (2L, R, 1ON). *Limited student price: US$110. **Leaders:** David K. Brezinski, Maryland Geological Survey; John F. Taylor; John E. Repetski; James D. Loch.

408. Appalachian Stratigraphy, Tectonics, and Eustasy from the Blue Ridge to the Allegheny Front, Virginia and West Virginia.*

Fri.–Sat., 30–31 Oct. US$230 (2L, R, 1ON). *Limited student price: US$115. **Leaders:** John T. Haynes, James Madison University; Alan Pitts; Richard J. Diecchio; Mitch Blake Bascombe Jr.; Ronald McDowell; Daniel H. Doctor.

409. Cenozoic Stratigraphy and Structure of the Chesapeake Bay Region.

Fri.–Sat., 30–31 Oct. US$180 (2L, R, 1ON). **Leaders:** David S. Powars, USGS; Lucy E. Edwards; J. Stephen Schindler; Susan M. Kidwell.

410. Coastal and Wetland Ecosystems of the Chesapeake Bay Watershed: Applying Palynology to Understand Impacts of Changing Climate, Sea Level, and Land Use.

Sat., 31 Oct. US$85 (1L, R). **Leaders:** Debra A. Willard, USGS; Christopher Bernhardt; Cliff R. Hupp. **Cosponsor:** *AASP - The Palynological Society.*

Key: B—breakfast; L—lunch; D—dinner; R—refreshments; ON—overnight lodging; * = discounted rates may be available for students.

411. **Geology, Engineering, and the Chesapeake & Ohio Canal (A William Smith Bicentenary Activity).**

Sat., 31 Oct. US$90 (1L). **Leaders:** Robert W. Krantz, ConocoPhillips; Katharine M. Loughney; John Tudek. **Cosponsors:** *William Smith Bicentenary Committee; GSA History and Philosophy of Geology Division.*

413. **Field Geology of the Baltimore Mafic Complex, Pennsylvania–Maryland State Line.***

Sat., 31 Oct. US$90 (1L, R). *Limited student price: US$50. **Leaders:** Stephen G. Shank, Pennsylvania Geological Survey; L. Lynn Marquez; Christopher R. Hardy. **Cosponsor:** *Pennsylvania Geological Survey.*

414. **Geologic Investigation of the Impact of a Subsurface Coal Fire: Centralia, Pennsylvania.**

Sat., 31 Oct. US$99 (1L, R). **Leaders:** Jennifer M. Elick, Susquehanna University; J. Fred McLaughlin.

415. **The Tectono-Thermal Evolution of the Central Appalachian Orogen: Accretion of a Peri-Gondwanan(?) Ordovician Arc.***

Sat., 31 Oct. US$87 (1L, R). *Limited student price: US$47. **Leaders:** Howell Bosbyshell, West Chester University; Lee Ann Srogi; William S. Schenck; Gale C. Blackmer. **Cosponsor:** *GSA Structural Geology and Tectonics Division.*

416. **Kirk Bryan Field Trip: Great Falls of the Potomac and the Evolution of a Decay-Phase Orogen, the Appalachian Mountains.**

Sat., 31 Oct. US$125 (1L, 1D, R). **Leaders:** Paul Bierman, University of Vermont; Eric Kirby; William B. Ouimet; Eric W. Portenga; Frank Pazzaglia; Gregory S. Hancock. **Cosponsor:** *GSA Quaternary Geology and Geomorphology Division.*

417. **The History of Stone Quarrying in the Baltimore Area, Including a Visit to the Historic Cockeysville Marble Quarry.**

Sat., 31 Oct. US$49 (R). **Leaders:** Joseph T. Hannibal, Cleveland Museum of Natural History; Page Herbert. **Cosponsor:** *Heritage Stone Task Force of the IUGS.*

418. **Hydrology and Geomorphology of Urban Streams and Riparian Zones in the Baltimore Metropolitan Area.**

Sat., 31 Oct. US$95 (1L, R). **Leaders:** Andrew Miller, Univ. of Maryland, Baltimore County; Claire Welty; Robert J. Shedlock; Edward J. Doheny. **Cosponsors:** *Andrew Miller, University of Maryland, Baltimore County; Claire Welty, University of Maryland, Baltimore County; Ed Doheny, USGS.*

419. **The Lost Springs of Washington, D.C., Late Tertiary and Quaternary Sediments of D.C., and the Baltimore LTER: The Hydrogeology of Urbanization.**

Sat., 31 Oct. US$90 (1L). **Leader:** John M. Sharp, The University of Texas Jackson School of Geosciences.

420. **K–12 Earth Science Educators Trip to the National Museum of Natural History.**

Sat., 31 Oct. US$28. **Leaders:** Michael J. Passow, Smithsonian Institution National Museum of Natural History; Adam Blankenbicker. **Cosponsors:** *Smithsonian Institution National Museum of Natural History; National Earth Science Teachers Association.*

421. **Rockin' DC: A Geological Overview of the National Mall and Its Building Stones.**

Sat., 31 Oct. US$85 (1L); students and K–12 teachers only. **Leaders:** Kenneth Rasmussen, Northern Virginia Community College; Victoria Martin. **Cosponsors:** *GSA Geoscience Education Division; GSA Sedimentary Geology Division.*

422. **The Geology of the Gettysburg Battlefield and its Influence on Military History.**

Sat., 31 Oct. US$130 (1L, 1D, R). **Leaders:** Roger J. Cuffey, Pennsylvania State Univ.; Vincent L. Santucci. **Cosponsors:** *Penn State University; National Park Service Geologic Resources Division; Gettysburg National Military Park.*

423. **The Delmarva Peninsula: A Field Laboratory for Studies of Shallow Groundwater Flow and Quality.**

Sat., 31 Oct. US$90 (1L). **Leaders:** Robert J. Shedlock, Maryland–Delaware–District of Columbia Water Science Center; Judith M. Denver; Jeff P. Raffensperger; Ward E. Sanford.

424. **Building Stones of Downtown Baltimore.**

Sat., 31 Oct. US$36. **Leaders:** David W. Bolton, Maryland Geological Survey; Joseph T. Hannibal. **Cosponsor:** *Heritage Stone Task Group of the International Union of Geological Sciences.*

POST-MEETING

425. **A Billion Years of Deformation in the Central Appalachians: Orogenic Processes and Products.***

Wed.–Fri., 4–6 Nov. US$250 (2B, 2L, R, 2ON). *Limited student price: US$125. **Leaders:** Steven J. Whitmeyer, James Madison University; Christopher M. Bailey; David B. Spears. **Cosponsor:** *GSA Structural Geology and Tectonics Division.*

426. **The Shale Hills Critical Zone Observatory.**

Thurs., 5 Nov. US$95 (1L, R). **Leaders:** Don Duggan-Haas, The Paleontological Research Institution; Susan L. Brantley; Tim White. **Cosponsors:** *GSA Geoscience Education Division; National Association of Geoscience Teachers.*

427. **Experience Capitol Hill: Geoscience and Public Policy in Washington D.C.**

Thurs., 5 Nov. US$49. **Leaders:** Kasey S. White, Geological Society of America; Jeffrey Rubin; David Robert Wunsch; Jonathan G. Price. **Cosponsor:** *GSA Geology and Public Policy Committee.*

Key: B—breakfast; L—lunch; D—dinner; R—refreshments; ON—overnight lodging; * = discounted rates may be available for students.

Thurs., 5 Nov. US$75 (1L). **Leaders:** Susan G. Stover, University of Kansas; Suzette Kimball; David Applegate; Virginia Burkett; Scott Southworth. **Cosponsors:** *GSA Geology and Public Policy Committee; USGS.*

429. **Acoustic Seafloor Mapping of the Baltimore Harbor.**

Thurs., 5 Nov. US$95. **Leaders:** Stephen VanRyswick, Coastal & Estuarine GeoSciences Program; Elizabeth Sylvia. **Cosponsor:** *Maryland Geological Survey.*

430. **Stream Restoration in Geologic Regions of Maryland.**

Thurs., 5 Nov. US$105 (1L). **Leaders:** Eric Dougherty, Maryland State Highway Administration Engineering Geology Division; Todd Nichols. **Cosponsor:** *Maryland State Highway Administration.*

431. **Late Devonian Climate Change and Glaciogenic Facies in the Central Appalachians.**

Thurs., 5 Nov. US$110 (1L, R). **Leaders:** David K. Brezinski, Maryland Geological Survey; Blaine Cecil; William DiMichele.

432. **The Building Stones of the National Mall.**

Thurs., 5 Nov. US$20. **Leaders:** Richard A. Livingston, University of Maryland; Carol A. Grissom. **Cosponsors:** *University of Maryland; Smithsonian Institution.*

433. **Smithsonian Museum of Natural History—Fossil Collections and Exhibitions.**

Thurs., 5 Nov. US$30. **Leaders:** Scott L. Wing, Smithsonian Institution; Kathy Hollis; Siobhan Starrs. **Cosponsor:** *Smithsonian Institution Museum of Natural History.*

434. **Tour of the Smithsonian Meteorite Collection.**

Thurs., 5 Nov. US$10. **Leader:** Cari Corrigan, Smithsonian Institution. **Cosponsor:** *GSA Planetary Geology Division.*

435. **Miocene Stratigraphy and Paleoenvironments of the Calvert Cliffs, Maryland.***

Thurs.–Fri., 5–6 Nov. US$160 (2L, R, 1ON). *Limited student price: US$85. **Leaders:** Susan M. Kidwell, Univ. of Chicago; Lucy E. Edwards; David S. Powars; Peter R. Vogt.

436. **Biology and Geology of Cranesville and Finzel Swamps in Garrett County, Western Maryland.**

Thurs.–Fri., 5–6 Nov. US$225 (2L, R, 1ON). **Leaders:** Dan Feller, Maryland Dept. of Natural Resources; Sunshine Brosi; Katherine Offerman.

437. **Karst of the Mid-Atlantic Region in Maryland, West Virginia, and Virginia.***

Thurs.–Sat., 5–7 Nov. US$380 (3L, 1D, 2ON). *Limited student price: US$200. **Leaders:** Daniel H. Doctor, USGS; David J. Weary; David K. Brezinski; Randall C. Orndorff; Lawrence E. Spangler. **Cosponsors:** *GSA Karst Division; GSA Hydrogeology Division; Karst Waters Institute; National Cave and Karst Research Institute.*

438. **Cretaceous Stratigraphy and Palynology of the Maryland Coastal Plain.***

Thurs., 5 Nov. US$120 (1L, R). *Limited student price: US$65. **Leaders:** Peter P. McLaughlin, University of Delaware; Heather Quinn. **Cosponsor:** *AASP - The Palynological Society.*

GSA Associated Society **Field Trips**

SOCIETY OF ECONOMIC GEOLOGISTS (SEG)

Register via the SEG website, **www.segweb.org.** Early registration: 1 Aug.–28 Sept. SEG reserves the right to cancel these trips should minimum attendance numbers (min. 12, max. 20) not be met. Late registration pricing begins after 28 Sept.

PRE-MEETING TRIP

The Historic Sykesville Ultramafic Rock-Associated, Fe-Cu-Co-Zn-Ni Mineral District: Tailings and Core.

Sat., 31 Oct. Leaders: Philip A. Candela, University of Maryland; Philip M. Piccoli, University of Maryland; Ann G. Wylie, University of Maryland.

POST-MEETING TRIP

Placer Deposits of the Atlantic Coastal Plain: Stratigraphy, Sedimentology, Mineral Resources, Mining and Reclamation.

Thur.–Fri., 5–6 Nov. Leaders: C. Richard Berquist, College of William and Mary; Adam Karst, Iluka Resources Inc.; Anjana K. Shah, USGS.

SOCIETY FOR SEDIMENTARY GEOLOGY (SEPM)

Student Field Trip: Geology and Paleontology of Calvert Cliffs (Chesapeake Group), Calvert County, Maryland.

Sun., 1 Nov. Fee: $25 (L D R). Limit: 35 participants—restricted to students only. Includes transportation and guidebook. Register at **www.sepm.org.** Leaders: Stephen Godfrey, Calvert Marine Museum; Peter Vogt, Marine Science Institute, University of California, Santa Barbara; John Nance, Calvert Marine Museum; and Bob Clarke, consultant.

Short Courses

FRIDAY–SATURDAY

501. Springs Inventory and Assessment

When: Fri.–Sat., 30–31 Oct., 8 a.m.–5 p.m.
Where: U.S. Fish and Wildlife Service's National Conservation Training Center (in Shepherdstown, West Virginia).
Cost: $685; includes breakfast, lunch, and transportation. Limit: 17. CEU: 1.6.
Instructors: Abraham Springer, Northern Arizona University; Lawrence Stevens, Springs Stewardship Institute; Dorothy Vesper, West Virginia University

502. Sequence Stratigraphy for Graduate Students

When: Fri.–Sat., 30–31 Oct., 8 a.m.–5 p.m.
Where: Hilton, Johnson Room
Cost: $US25. Extra! Upon completion of the course, participants will receive a US$25 coupon redeemable at GSA's onsite bookstore. Limit: 55. CEU: 1.6.
Instructors: Bob Stewart, ExxonMobil; Bret Dixon, Anadarko; Art Donovan, BP; Morgan Sullivan, Chevron; Kirt Campion, Marathon

503. Field Safety Leadership

When: Fri.–Sat., 30–31 Oct., 8 a.m.–5 p.m.
Where: Baltimore Convention Center, Room 304
Cost: US$25; includes lunch. Extra! Upon completion of the course, participants will receive a US$25 coupon redeemable at GSA's onsite bookstore. Limit: 24. CEU: 1.6.
Instructors: David Story, ExxonMobil Upstream Research Co.; Pam Collins, ExxonMobil Upstream Research Co.; Kevin Bohacs, ExxonMobil Upstream Research Co.

504. Introduction to Petroleum Structural Geology

When: Fri.–Sat., 30–31 Oct., 8 a.m.–5 p.m.
Where: Baltimore Convention Center, Room 305
Cost: US$25; includes lunch. Extra! Upon completion of the course, participants will receive a US$25 coupon redeemable at GSA's onsite bookstore. Limit: 30. CEU: 1.6.
Instructors: J. Steve Davis, ExxonMobil Upstream Research Co.; Garrett Vice, ExxonMobil Upstream Research Co.

505. Structural and Stratigraphic Concepts Applied to Basin Exploration

When: Fri.–Sat., 30–31 Oct., 8 a.m.–5 p.m.
Where: Baltimore Convention Center, Room 306
Cost: US$25; includes lunch. Extra! Upon completion of the course, participants will receive a US$25 coupon redeemable at GSA's onsite bookstore. Limit: 30. CEU: 1.6.
Instructors: Bob Stewart, ExxonMobil Exploration Co.; Lori Summa, ExxonMobil Upstream Research Co.

506. Dynamics of the Subsurface Flow of Groundwater, Hydrocarbons, and Sequestered CO_2: Physics and Field Examples

When: Fri.–Sat., 30–31 Oct., 8 a.m.–5 p.m.
Where: Hilton Baltimore, Peale A Room
Cost: $165. Limit: 40. CEU: 1.6.
Instructor: K. Udo Weyer, WDA Consultants Inc.

SATURDAY

507. Near-Surface Geophysics for Non-Geophysicists

When: Sat., 31 Oct., 8 a.m.–5 p.m.
Where: Hilton Baltimore, Calloway Room
Cost: $83; includes course materials. Limit: 30. CEU: 0.8.
Instructor: Gregory Baker, University of Kansas

508. Making a GeoFabLab: How to Combine 3D Scanning, 3D Modeling, and 3D Printing for Education and Research

When: Sat., 31 Oct., 8 a.m.–5 p.m.
Where: Hilton Baltimore, Paca Room
Cost: $100. Limit: 30. CEU: 0.8.
Instructors: Franek Hasiuk, Iowa State University; Ian Saginor, Keystone College; Aaron Wood, Iowa State University

509. Introduction to Story Maps: Workshop and Hands-On Session

When: Sat., 31 Oct., 8 a.m.–5 p.m.
Where: Hilton Baltimore, Holiday Ballroom 2
Cost: $108. Limit: 40. CEU: 0.8.
Instructors: Lee Bock, ESRI; Jon Bowen, ESRI; Allen Carroll, ESRI; Suzanne O'Connell, Wesleyan University

510. Introduction to Terrestrial Laser Scanning (Ground-Based LiDAR) for Earth Science Research and Education

When: Sat., 31 Oct., 8 a.m.–5 p.m.
Where: Sheraton Inner Harbor, Severn Room 1
Cost: $45. Limit: 25. CEU: 0.8.
Instructors: Marianne Okal, UNAVCO; Christopher Crosby, UNAVCO; Carlos Aiken, The University of Texas at Dallas

511. Three-Dimensional Geologic Mapping

When: Sat., 31 Oct., 8 a.m.–5 p.m.
Where: Sheraton Inner Harbor, Loch Raven Room
Cost: $84; includes lunch. Limit: 70. CEU: 0.8.
Instructors: Richard Berg, Illinois State Geological Survey; Harvey Thorleifson, Minnesota Geological Survey; Hazen Russell, Geological Survey of Canada; Kelsey MacCormack, Alberta Geological Survey

512. Statistical Treatment of Structural Geology Data

When: Sat., 31 Oct., 8 a.m.–5 p.m.
Where: Hilton Baltimore, Ruth Room
Cost: $100. Limit: 40. CEU: 0.8.
Instructors: Basil Tikoff, University of Wisconsin Madison; Davis Joshua, Carleton College; Sarah Titus, Carleton College

513. Applications of Commercial Satellite Imagery for Polar Science

When: Sat., 31 Oct., 8 a.m.–5 p.m.
Where: Sheraton Inner Harbor, Camden Room I
Cost: $109. Limit: 25. CEU: 0.8.
Instructors: Lucas Winzenburg, University of Minnesota; Paul Morin, University of Minnesota; Claire Porter, University of Minnesota; Mark Salvatore, Arizona State University

514. Ground-Penetrating Radar: Principles, Practice, and Processing

When: Sat., 31 Oct., 8 a.m.–5 p.m.
Where: Hilton Baltimore, Pickersgill Room
Cost: $50. Limit: 24. CEU: 0.8.
Instructors: Greg Johnston, Sensors & Software Inc.; Troy De Souza, Sensors & Software Inc.

515. Building Teaching Skills for Future Faculty

When: Sat., 31 Oct., 8 a.m.–5 p.m.
Where: Hilton Baltimore, Tubman Room
Cost: $100. Limit: 40. CEU: 0.8.
Instructors: Anne Egger, Central Washington University; David McConnell, North Carolina State University

516. Medical Geology: How the Natural Environment Gets Away with Murder

When: Sat., 31 Oct., 8:30 a.m.–5 p.m.
Where: Hilton Baltimore, Holiday Ballroom 1
Cost: $81. Limit: 50. CEU: 0.75.
Instructors: Robert Finkelman, The University of Texas at Dallas; Thomas Darrah, Ohio State University; Laura Ruhl, University of Arkansas at Little Rock; Jose Centeno, The Joint Pathology Center

517. Digital Evolutionary Trees: Create Exciting Evolutionary Trees, Packed with Images and Information and Integrated with a Comprehensive Earth History Database

When: Sat., 31 Oct., 9 a.m.–4 p.m.
Where: Johns Hopkins University, Room TBA
Cost: $40. Limit: 30. CEU: 0.6.
Instructors: Barry Fordham, The Australian National University; James Ogg, Purdue University

518. U-Th-Pb Geochronology and Hf Isotope Geochemistry Applied to Detrital Minerals

When: Sat., 31 Oct., 9 a.m.–5 p.m.
Where: Sheraton Inner Harbor, Potomac Room
Cost: $45. Limit: 40. CEU: 0.7.
Instructor: George Gehrels, University of Arizona

519. Digital Geologic Mapping: Flat Map Data Collection with QGIS and Introduction to 3D Mapping Techniques

When: Sat., 31 Oct., 9 a.m.–5 p.m.
Where: Sheraton Inner Harbor, Sassafras Room
Cost: $109. Limit: 25. CEU: 0.7.
Instructors: Terry Pavlis, The University of Texas at El Paso; Richard Langford, The University of Texas at El Paso; Jose Hurtado, The University of Texas at El Paso; Steven Whitmeyer, James Madison University

520. Digital Field Mapping and Model Building

When: Sat., 31 Oct., 9 a.m.–5 p.m.
Where: Hilton Baltimore, Douglass Room
Cost: $25. Extra! Upon completion of the course, participants will receive a US$25 coupon redeemable at GSA's onsite bookstore. Limit: 25. CEU: 0.7.
Instructor: Peter Rourke, Midland Valley

521. Time Series Data Publication with the CUAHSI Water Data Center

When: Sat., 31 Oct., 8 a.m.–noon.
Where: Sheraton Inner Harbor, Harborview Ballroom II
Cost: $50. Limit: 25. CEU: 0.4.
Instructor: Jon Pollak, Consortium of Universities for the Advancement of Hydrologic Science Inc. (CUAHSI)

522. Geochemical Modeling for Students and Teachers

When: Sat., 31 Oct., 8 a.m.–noon.
Where: Sheraton Inner Harbor, Harborview Ballroom I
Cost: $43. Limit: 50. CEU: 0.4.
Instructors: Craig Bethke, University of Illinois at Urbana–Champaign; Brian Farrell, Aqueous Solutions LLC; Katelyn Zatwarnicki, Aqueous Solutions LLC

523. William "Strata" Smith and Geo-Education: Using the History of Geology for Teaching Mapping, Scientific Practices, and the Nature of Science

When: Sat., 31 Oct., 8 a.m.–noon.
Where: Sheraton Inner Harbor, Severen Room II/III
Cost: $20. Limit: 30. CEU: 0.4.
Instructors: Renee Clary, Mississippi State University; Glenn Dolphin, University of Calgary; Brenda Kirkland, Mississippi State University

524. Teaching Controversial Issues 1: Climate and Energy

When: Sat., 31 Oct., 8 a.m.–noon.
Where: Hilton Baltimore, Carroll Room
Cost: $35. Limit: 35. CEU: 0.4.
Instructors: Don Duggan-Haas, Paleontological Research Institution and its Museum of the Earth; Scott Mandia, Suffolk County Community College; Glenn Dolphin, University of Calgary; Richard Kissel, Yale Peabody Museum of Natural History; Stephanie Keep, National Center for Science Education; Robert Ross, Paleontological Research Institute and its Museum of the Earth

525. Quantitative Optical Mineralogy

When: Sat., 31 Oct., 8 a.m.–noon.
Where: Sheraton Inner Harbor, Camden Room II
Cost: $45. Limit: 30. CEU: 0.4.
Instructor: James Nicholls, University of Calgary

526. Using Geodetic Data in Introductory Courses: Ice Mass and Sea-Level Changes Module for Intro-Level Undergraduates

When: Sat., 31 Oct., 8 a.m.–noon.
Where: Hilton Baltimore, Brent Room
Cost: $30. Limit: 30. CEU: 0.4.
Instructors: Becca Walker, Mt. San Antonio College; Beth Pratt-Sitaula, UNAVCO

527. Teaching Geoethics across the Geoscience Curriculum

When: Sat., 31 Oct., 8 a.m.–noon.
Where: Hilton Baltimore, Holiday Ballroom 3
Cost: $50. Limit: 50. CEU: 0.4.
Instructors: David Mogk, Montana State University; John Geissman, The University Texas at Dallas

528. Professional Geoscience Ethics: Fundamentals and Case Histories

When: Sat., 31 Oct., 1–5 p.m.
Where: Sheraton Inner Harbor, Harborview Ballroom I
Cost: $70. Limit: 50. CEU: 0.4.
Instructors: David Abbott Jr., American Institute of Professional Geologists

529. Teaching Controversial Issues 2: Evolution of Life and Earth

When: Sat., 31 Oct., 1–5 p.m.
Where: Hilton Baltimore, Carroll Room
Cost: $35. Limit: 35. CEU: 0.4.
Instructors: Don Duggan-Haas, Paleontological Research Institution and its Museum of the Earth; Scott Mandia, Suffolk County Community College; Glenn Dolphin, University of Calgary; Richard Kissel, Yale Peabody Museum of Natural History; Stephanie Keep, National Center for Science Education; Robert Ross, Paleontological Research Institute and its Museum of the Earth

530. Groundwater–Surface-Water Interactions: Concepts Every Geoscientist Should Know

When: Sat., 31 Oct., 1–5 p.m.
Where: Sheraton Inner Harbor, Camden Room II
Cost: $95. Limit: 30. CEU: 0.4.
Instructor: Judson Harvey, U.S. Geological Survey

531. Interactive Strategies for the Classroom: A How-to Guide Using Examples about Igneous Rocks

When: Sat., 31 Oct., 1–5 p.m.
Where: Sheraton Inner Harbor, Severn Room II/III
Cost: $20. Limit: 40. CEU: 0.4.
Instructors: Karen Kortz, Community College of Rhode Island; Jessica Smay, San Jose City College

532. Supporting Student Success in Geoscience Departments and Programs

When: Sat., 31 Oct., 1–5 p.m.
Where: Hilton Baltimore, Holiday Ballroom 3
Cost: $50. Limit: 40. CEU: 0.4.
Instructors: Diane Doser, The University of Texas at El Paso; James Ebert, SUNY College at Oneonta; Virginia Peterson, Grand Valley State University

533. Welcome to the Anthropocene: Teaching Resources for a New Epoch

When: Sat., 31 Oct., 1–5 p.m.
Where: Sheraton Inner Harbor, Harborview Ballroom II
Cost: $25. Extra! Upon completion of the course, participants will receive a US$25 coupon redeemable at GSA's onsite bookstore. Limit: 50. CEU: 0.4.
Instructors: Mark Nielsen, The Howard Hughes Medical Institute; Missy Holzer, Rutgers University Graduate School of Education

534. Using Geodetic Data in Majors-Level Courses: Analyzing Active Tectonics with LiDAR, InSAR, and GPS Data Applied to Critical Societal Issues

When: Sat., 31 Oct., 1–5 pm.
Where: Hilton Baltimore, Brent Room
Cost: $30. Limit: 30. CEU: 0.4.
Instructors: Bruce Douglas, Indiana University; Beth Pratt-Sitaula, UNAVCO; Vince Cronin, Baylor University

535. How to Talk to Strangers: Selling Yourself and Your Science—For Students

When: Sat., 31 Oct., 2–4 p.m.
Where: Baltimore Convention Center, Room 304
Cost: $10. Limit: 50. CEU: 0.4.
Instructors: Beth Bartel, UNAVCO; Gifford Wong, Dartmouth College

GSA Associated Society **Course**

GSA does not handle registration for this course.

PALEONTOLOGICAL SOCIETY

Earth-Life Transitions: Paleobiology in the Context of Earth System Evolution

Sat., 31 Oct., 9 a.m.–5 p.m., Baltimore Convention Center, Room 310. No registration required. Cost: FREE. Limit: None. CEU: None. **Instructors:** P. David Polly, Indiana University; Jason J. Head, University of Nebraska–Lincoln; David L. Fox, University of Minnesota. Learn more at community.geosociety.org/gsa2015/science-careers/courses#as.

FEED YOUR BRAIN
THE GEOLOGICAL SOCIETY OF AMERICA®

LUNCHTIME ENLIGHTENMENT

Buy your food and take it in

Baltimore Convention Center, Room 327–329

Mon.–Wed., 2–4 Nov., 12:15–1:15 p.m.

Grab your lunch at a nearby convention center vendor and enjoy a little *lunchtime enlightenment* during GSA's **Feed Your Brain** series.

Monday

James Balog, Founder & President, Earth Vision Institute & Extreme Ice Survey: "The Art & Science of Chasing Ice." See the August issue of *GSA Today* for talk highlights.

Tuesday

Marcia McNutt, Editor-in-Chief of *Science* and former USGS director: 2015 Michel T. Halbouty Lecturer & GSA Geology & Society Division Distinguished Lecturer: "Deepwater Horizons: Lessons Learned for Better Disaster Preparedness" (see below).

Wednesday

Ellen Stofan, NASA Chief Scientist: "Science at NASA: Exploring Planets in this Solar System and Beyond." Look for highlights in the October issue of *GSA Today*.

Deepwater Horizons: Lessons Learned for Better Disaster Preparedness

Marcia McNutt, *Editor-in-Chief of* Science*, former USGS director, and 2015 Michel T. Halbouty Lecturer and GSA Geology and Society Division Distinguished Lecturer.*

Tuesday, 3 Nov., 12:15–1:15 p.m.

The Deepwater Horizon explosion and resulting oil spill were a human and an environmental tragedy. Marcia McNutt will share insights based on her experiences participating in the response to the event. Understanding this disaster will help companies, scientists, and policy makers better prepare for future oil spills, such as fostering a community of disaster professionals, establishing more formal processes for delivering actionable science, and improving the communication of scientific information during emergencies.

McNutt (BA in physics, Colorado College; Ph.D. in earth sciences, Scripps Institution of Oceanography) is a geophysicist who became the 19th Editor-in-Chief of *Science* in June 2013.

From 2009 to 2013, McNutt was director of the U.S. Geological Survey, which responded to a number of major disasters during her tenure, including the Deepwater Horizon oil spill. For her work to help contain that spill, McNutt was awarded the U.S. Coast Guard's Meritorious Service Medal. She is a fellow of AGU, GSA, AAAS, and the International Association of Geodesy, and has recently been elected president of the National Academy of Sciences, to begin her term in July 2016. Her honors and awards include honorary doctoral degrees from Colorado College, the University of Minnesota, Monmouth University, and the Colorado School of Mines. McNutt was awarded the Macelwane Medal by AGU in 1988 for research accomplishments by a young scientist and the Maurice Ewing Medal in 2007 for her significant contributions to deep-sea exploration.

Congratulations to the 2015 On To the Future (OTF) Travel Awardees.

GSA recently awarded more than 100 travel grants to a select group of students from groups underrepresented in the geosciences to attend their first GSA Annual Meeting. OTF students were chosen based on their commitment to pursuing a career in the geosciences, merit, and financial need.

Looking For a Mentoring Opportunity at the Meeting?

Mentor OTF students by helping them navigate their first professional meeting, and help guide them toward future success. For more information, check the OTF website: **community.geosociety.org/otf/annualmeetingprogram/mentors.**

Diversity in the Geosciences and On To the Future Alumni Reception

Tues., 3 Nov., 5:30–7 p.m.

The GSA Diversity in the Geosciences Committee invites you to attend a relaxing forum for socializing, sharing ideas, and meeting other geoscience community members interested in diversity issues. The 2015 On To the Future Scholars and ExxonMobil Minority Scholarship Awardees will be recognized. Appetizers and cash bar provided.

The Geological Society of America®

GEOCAREERS

Events

PRE-MEETING WEBINAR

Getting Discovered at GSA's Annual Meeting

Wed., 14 Oct., 11 a.m. MST

This one hour, *pre-meeting* webinar will provide geoscience students with a set of practical tools and strategies for successfully networking and navigating their way around the annual meeting. To register for this event go to **community.geosociety.org/gsa2015/science-careers/careers.**

WORKSHOP

The Pathways to a Successful Career: Building Value

Sat., 31 Oct. 1–4 p.m., Hilton, Ballroom 6
Instructor: Patrick McAndless, P.Geo, FGC

Whether you are just beginning your career or changing your path, learn how to showcase your potential value to employers and build marketing tools to help you succeed. This workshop will feature industry professionals who will offer tips and suggestions for navigating their company hiring process, and it is highly recommended for any student attending the GeoCareers in Industry events. To register for this event go to **community.geosociety.org/gsa2015/science-careers/careers.**

CAREER PANELS

Geology in Industry Career Pathways Luncheon

Sun., 1 Nov., 11:30 a.m.–1 p.m.

Company representatives will offer advice about preparing for a career in industry and comment on the prospects for current and future job opportunities with their companies.

Geology in Government Career Pathways Luncheon

Mon., 2 Nov., 11:30 a.m.–1 p.m.

A panel of representatives from a variety of government agencies will offer advice about preparing for a career in government and comment on job opportunities with their agencies.

The Paleontological Society Mentors in Paleontology Careers Luncheon

Mon., 2 Nov., noon–1 p.m.

This student luncheon features a panel of mentors representing a variety of colleges, universities, museums, and government agencies. They will offer advice about preparing for a career in paleontology and comment on current and future job opportunities.

Résumé Clinic

Sun., 1 Nov., 9 a.m.–5 p.m.

Plan to sign-up on-site for a private consultation with a geoscience professional to review your résumé and discuss strategies to better market yourself to potential employers.

GeoCareers in Industry

Sun., 1 Nov., 9 a.m.–5:30 p.m.

If you are interested in a career path in industry, consider attending this full day of events, during which you will have a chance to interact one-on-one with company representatives. Throughout the day, you will visit company booths to learn about their unique culture and environment, present your research, and learn from representatives about their career experiences at both a luncheon and an evening reception. We recommend that you attend the Building Value Workshop on Sat., 31 Oct., to build your background knowledge of geoscience industries and to pick up strategies for marketing yourself. To register for this event go to **community.geosociety.org/gsa2015/science-careers/careers.**

NETWORKING

John Mann Mentors in Applied Hydrogeology Program

If you are a student in GSA's Hydrogeology Division and you are registered for the meeting, keep an eye on your e-mail on 29 Sept. for the opportunity to receive a free ticket to the Hydrogeology Division Luncheon and Awards Presentation on Tues., 3 Nov., 11:30 a.m.–3:30 p.m.

Women in Geology Career Pathways Reception

Sun., 1 Nov., 5–6:30 p.m.
Featured speaker: Dr. France Córdova, Director of the National Science Foundation

This informal gathering begins with remarks from a few key women speakers who will address issues faced by women in geology. A reception follows, providing time for networking, sharing ideas, and getting to know other women geoscientists.

Student Networking Luncheon

Tues., 3 Nov., 11:30 a.m.–1 p.m.

This light luncheon provides an opportunity for students and early career scientists to network with more than 40 geoscience professionals. These mentors will answer questions, offer advice about career plans, and comment on job opportunities within their fields.

Be Heard & Be Interesting

Science communication strategies for interacting with the public, policy makers, and social media

Saturday, 31 Oct., 8 a.m.–noon.

Cost: Professionals:US$35; students: US$25; includes continental breakfast. Limit: 30. Sign up when you register or call GSA Sales & Service, +1-800-443-4472, to add this course.

Have you struggled to explain your research to a friend? Would you like to be able to tell your Senator your views on policy? Are you interested in using Twitter but aren't sure how? Learn from experts and each other as you hone your public communication and outreach skills, and practice in a safe and comfortable setting.

You will leave knowing how to create clear and concise messages targeted to your audience, as well as how to prepare for a media interview. You will learn strategies for using social media, identify opportunities for interacting with laypersons in your community, and gain an understanding of how to approach policy makers on scientific issues.

Communication skills are key to a successful career and important in all aspects of life. Give yours the attention they deserve.

What's Your Problem; What's Your Point?

▶ When: Sunday, 1 Nov., 11:30–2 p.m.

FREE (but an application is required) — *Lunch is provided.*

Publishing your work is important, but how do you go about it? This workshop, led by experienced GSA science editors, will focus on the process of preparing your research for submission to scholarly journals. Presentations by editors will be followed by round-table discussions. Three stages are covered in detail: (1) before you begin; (2) writing and revising; and (3) reviewing—becoming a part of the scholarly community.

The Geological Society of America®
GEOCAREERS

Photo by Bret Webster.

Meet Us in the Social Media–Sphere

Twitter: https://twitter.com/geosociety
Follow hashtag #GSA2015

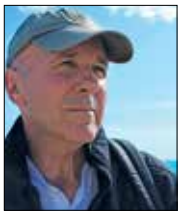
Facebook: https://www.facebook.com/GSA.1888

LinkedIn: https://www.linkedin.com/company/geological-society-of-america

GSA's Connected Community: community.geosociety.org

Special **Lecture**

William Smith: The Man, His Map and the Democratization of Geology



Simon Winchester

Sun., 1 Nov., 4–5 p.m.
Baltimore Convention Center,
Room 327/328/329

To pluck William Smith from two centuries of dusty obscurity and place him, quite rightly, on a pedestal as one of the truly great men of his time was the task confronting Simon Winchester when, in 2000, he decided to write the remarkable story of the so-called Father of English Geology. The saga he uncovered was poignant and inspiring: The manner in which he—nearly forty years after graduating with a geology degree from Oxford, but in no sense a practitioner of the science—came to the tale in the first place, turns out to be every bit as amusing as it is instructive.

After spending just a year as a geologist in East Africa, Oxford graduate Simon Winchester turned to journalism and spent 30 years as a foreign correspondent working around the world for *The Guardian* and *The Sunday Times* of London. In 1998, following the unexpected success of his book about nineteenth-century lexicography, *The Professor and the Madman*, Winchester became a full-time writer, and has now published 27 books, many of them *New York Times* best-sellers. In 2006, for services to literature, he was awarded officership of the Order of the British Empire (OBE) by Her Majesty the Queen. His latest book, *Pacific*, will be released on 27 Oct. 2015.

EXHIBITORS
in alphabetical order

(as of press time)

AASP - The Palynological Society: Booth 1045

American Association of Petroleum Geologists / AAPG Bookstore: Booth 961

American Geophysical Union: Booth 923

American Geosciences Institute: Booth 957

American Institute of Professional Geologists: Booth 853

American Meteorological Society: Booth 947

American Museum of Natural History Master of Arts in Teaching Program: Booth 235

American Quaternary Association: Booth 552

Armfield Inc.: Booth 562

ASC Scientific: Booth 530

Association for Women Geoscientists: Booth 858

Association of American State Geologists: Booth 855

Association of Earth Science Editors: Booth 964

Auburn University Dept. of Geology & Geography: Booth 123

Ball State University: Booth 314

Baylor University: Booth 422

Beta Analytic Inc.: Booth 619

Bruker Corporation: Booth 937

Bureau of Ocean Energy Management/Marine Minerals Program: Booth 534

Cambridge University Press: Booth 710

Central Washington University: Booth 206

Consortium of Universities for the Advancement of Hydrologic Science Inc. (CUAHSI): Booth 446

Council on Undergraduate Research: Booth 435

Cushman Foundation for Foraminiferal Research: Booth 1035

Dept. of Geology University of Buffalo: Booth 207

Dino-Lite Scopes (BigC): Booth 317

DirectAMS: Booth 849

DOSECC Exploration Services LLC: Booth 426

EarthScope: Booth 451

EARTHTIME: Booth 448

East Carolina University: Booth 208

Elementar Americas: Booth 946

Elsevier: Booth 412

Environmental & Engineering Geophysical Society: Booth 916

Environmental Isotope Lab: Booth 514

ESRI: Booth 518

Estwing Mfg. Co.: Booth 934

European Geosciences Union (EGU): Booth 559

Field Environmental Instruments: Booth 919

Florida International University: Booth 103

Forestry Suppliers Inc.: Booth 1010

FOSSIL (The FOSSIL Project): Booth 1041

Gems & Crystals Unlimited: Booth 423

Geochemical Society: Booth 1018

Geocognition Research Lab: Booth 658

Geological Association of Canada: Booth 1016

The Geological Society of London: Booth 960

Geophysical Survey Systems Inc.: Booth 759

GEOROC Database: Booth 932

Geoscience Information Society: Booth 416

GeoScienceWorld: Booth 910

Geoscientists Without Borders–SEG Humanitarian Program: Booth 956

GIA: Booth 418

GNS Science: Booth 411

GSA Geoinformatics Division: Booth 1011

GSA Geology and Health Division: Booth 1015

GSA Geology and Society Division: Booth 1005

GSA History & Philosophy of Geology Division: Booth 1017

GSA Hydrogeology Division: Booth 1013

GSA International: Booth 1019

GSA Karst Division: Booth 550

GSA Limnology Division: Booth 1021

GSA Planetary Geology Division: Booth 1027

Hofstra University: Booth 306

HORIBA Scientific: Booth 419

Howard Hughes Medical Institute: Booth 914

IKON Mining: Booth 511

Indiana University–Bloomington: Booth 318

Institute for Broadening Participation: Booth 347

International Association for Geoscience Diversity: Booth 431

International Association of GeoChemistry: Booth 1012

International Centre for Diffraction Data: Booth 930

International Chemical Analysis Inc.: Booth 331

International Nannoplankton Association: Booth 1037

International Union of Geological Sciences: Booth 936

Iowa State University: Booth 219

IRIS Consortium: Booth 453

Isomass Scientific Inc.: Booth 413

John D Cooper Center: Booth 1036

Jones & Bartlett Learning: Booth 817

Kansas State University: Booth 336

Komodo Dragon: Booth 522

LacCore / CSDCO: Booth 835

Little River Research & Design: Booth 831

Macroscopic Solutions LLC: Booth 424

Mala Geoscience USA Inc.: Booth 718

Mappt: Booth 442

Martin Microscope Company: Booth 943

Meiji Techno America: Booth 319

Micropaleontology Press: Booth 1039

Midland Valley Exploration Ltd.: Booth 333

Mineralogical Association of Canada: Booth 1026

Mineralogical Society of America: Booth 1022

Mississippi State University: Booth 430

Missouri State University—MS Geospatial Sciences in Geology: Booth 302

Missouri University of Science and Technology: Booth 300

Mountain Press Publishing Company: Booth 912

NASA: Booth 823

National Association of Geoscience Teachers: Booth 931

National Association of State Boards of Geology (ASBOG®): Booth 313

National Cave and Karst Research Institute: Booth 546

National Park Service: Booth 436

National Science Foundation: Booth 447

Natural Earth Craft LLC: Booth 311

New Mexico Highlands University: Booth 202

NSF Antarctic and Arctic Data Consortium: Booth 450

Oklahoma State University Boone Pickens School of Geology: Booth 220

Olympus: Booth 532

Oregon State University: Booth 815

Oxford University Press: Booth 615

Pearson: Booth 714

Purdue University: Booth 238

EXHIBIT HALL HOURS

Sunday: Exhibits open: 2–7 p.m.;
Exhibits Opening Reception: 5:30–7 p.m.

Monday & Tuesday: 9 a.m.–6:30 p.m.

Wednesday: 9 a.m.–2 p.m.

Riegl USA: Booth 415
Rigaku Americas Corporation: Booth 437
Rite in the Rain: Booth 819
Rock Detective Geoscience Education: Booth 467
Ruen Drilling Inc.: Booth 939
San Diego State University: Booth 322
Saudi Aramco: Booth 917
SciAps Inc.: Booth 851
selFrag AG: Booth 417
Sensors & Software Inc.: Booth 536
SEPM (Society for Sedimentary Geology): Booth 441
Sigma Gamma Epsilon: Booth 337
Society for the Preservation of Natural History Collections: Booth 1040
South Dakota School of Mines and Technology: Booth 338
Springer: Booth 611
STEPPE: Booth 1023
Syracuse University: Booth 111
Taylor & Francis Group Ltd.: Booth 918
Temple University Earth & Environmental Science: Booth 236
Texas A&M University: Booth 432
Texas Tech University: Booth 216
The Clay Minerals Society: Booth 1014
The Geochemist's Workbench: Booth 758
The Paleobiology Database: Booth 1033
The Paleontological Society: Booth 1043
Thermo Scientific: Booth 510
Treatise on Invertebrate Paleontology: Booth 1042
Tulane University Dept. of Earth & Environmental Sciences: Booth 119
UNAVCO Inc.: Booth 452
University of Arkansas: Booth 107
University of California Riverside: Booth 113
University of California, Davis, Earth and Planetary Sciences: Booth 237
University of Connecticut Center for Integrative Geosciences: Booth 234
University of Delaware: Booth 213
University of Idaho: Booth 135
University of Kansas: Booth 327
University of Kentucky Dept. of Earth & Environmental Science: Booth 210
University of Massachusetts Geosciences: Booth 105
University of Michigan: Booth 109
University of Missouri: Booth 320
University of Nevada–Las Vegas Dept. of Geoscience: Booth 312
University of Nevada–Reno: Booth 310
University of North Carolina–Charlotte: Booth 205
University of Notre Dame: Booth 212
University of Pennsylvania: Booth 218
University of South Carolina: Booth 222
University of Southern California Dept. of Earth Sciences: Booth 121
University of Tennessee: Booth 139
University of Texas–Jackson School of Geosciences: Booth 857
University of Texas at Dallas: Booth 334
University of Texas at El Paso: Booth 221
University of Wisconsin–Madison: Booth 215
USDA Forest Service: Booth 716
Virginia Tech Dept. of Geosciences: Booth 410
W.W. Norton: Booth 1030
Waveland Press: Booth 617
West Virginia University: Booth 304
Western Michigan University Dept. of Geosciences: Booth 203
Wildcat Technologies LLC: Booth 323
Wiley: Booth 911
Wink Vibracore Drill Co. Ltd.: Booth 847
Yachay Tech University: Booth 223
Yale University Dept. of Geology and Geophysics: Booth 117
Yellowstone Bighorn Research Association: Booth 433

Thank You Sponsors!

Your support of The Geological Society of America's Annual Meeting & Exposition continues a tradition of more than 125 years of serving science and the profession. The Society appreciates your investment in the growth of current and future leaders in the geoscience community. (Note: Sponsors as of July 2015.)

DOUBLE DIAMOND

ExxonMobil

GOLD

Anadarko

Chevron

GEODE

Image Audiovisuals*

Johns Hopkins University Dept. of Earth & Planetary Sciences

GOLD

S.S. Papadopulis

Towson University

SILVER

Newmont Mining Corporation

BRONZE

Association for Women Geoscientists

CONTRIBUTOR

CH2M Hill*

McCormick/World of Flavors*

The GSA Foundation is proud to continue its work in support of GSA and its programs.

*denotes in-kind contribution

Baltimore Sites **Highlights**

LOCUST POINT

Locust Point is a charming neighborhood located in South Baltimore. Along with being the home to Fort McHenry, the neighborhood is surrounded by the Locust Point Industrial Area from Lawrence Street to the west and the Patapsco River to the north, south, and east. Once serving as a center of Baltimore's Polish-American, Irish-American, and Italian-American communities, it is now home to Under Armour's global headquarters in Tide Point, a historic waterfront rehab located at the end of Hull Street. In 1706, the peninsular Locust Point—then called Whetstone Point, after a park in London—was established as a port of entry by the Maryland Colonial Assembly. Whetstone Point and the future South Baltimore peninsula were annexed by the City of Baltimore in 1816 and later renamed Locust Point because of the locust trees growing there. Aside from Fort McHenry, Locust Point also offers a great view of the Domino Sugar plant and its massive neon sign, an iconic feature of the Baltimore skyline.

HARBOR EAST

Situated on a spectacular stretch of waterfront just east of the Inner Harbor and just west of historic Fell's Point, trendy Harbor East beckons with its growing list of shopping and dining options. An array of unique local and national retailers and restaurants—all steps from a variety of hotels—offer everything from shoes to sushi and furniture to fine wines. Whether you want to grab a taco between shops or linger over an elegant five-course meal at one of America's top-rated restaurants, you'll find that Baltimore's newest destination is also one of its finest. An upscale movie theater, spa & health club, as well as a Whole Foods Market round out the Harbor East experience.

http://baltimore.org/info/neighborhoods

1–4 NOVEMBER

GSA 2015

Baltimore, Maryland, USA

ROCK STARS:

Silhouette of William Smith, given by Smith (who probably drew it) to Samuel Woodward on 27 June 1833, when they met at the British Association meeting in Cambridge. Courtesy of Norfolk Museums Service.

William "Strata" Smith

Hugh Torrens, *Keele University, Keele, Staffordshire ST5 5BG, UK*

William Smith's career should be of special interest to today's aspiring geoscientists for the very many difficulties—both "scientific" (a word not yet in common use) and financial—that he overcame with extraordinary resolve. Most notably, he largely single-handedly produced the remarkably accurate and enormous (2.57 m × 1.80 m) stratigraphic map of England and Wales, with a part of Scotland, published in September 1815 (see next page). Mostly self-taught and trained on the job, Smith's motivations were primarily practical—finding and developing resources and reclaiming lands. For much of his life, Smith was ignored or treated as an outsider; in any case, there was not yet much of a proper geological community that could take interest in such an unusual man.

William Smith was born on 23 March 1769 at The Forge, Churchill, Oxfordshire, England, son of village blacksmith John Smith and his wife Ann; his father died when he was 7, after which he was raised by his uncle. He grew up on the notably fossiliferous Middle Jurassic rocks in the English Cotswolds, where such fossils were his playthings. Educated at the village school until the age of 11 or 12, Smith at 18 became assistant to engineer and land surveyor Edward Webb at the town of Stow on the Wold, where he learned to make accurate maps and to assess land values. Impressed by Smith's abilities, Webb in late 1791 sent Smith to survey estates belonging to Lady Elizabeth Jones in north Somerset. Smith walked more than 50 miles to get there and lodged at Rugbourne Farm, which he later named the birthplace of all his ideas. In Somerset, thin coal seams were mined in small, often deep mines, and Smith soon became involved in underground surveys, which set him thinking about the succession of strata. These same beds had inspired pioneer stratigraphic observations by John Strachey in 1719.

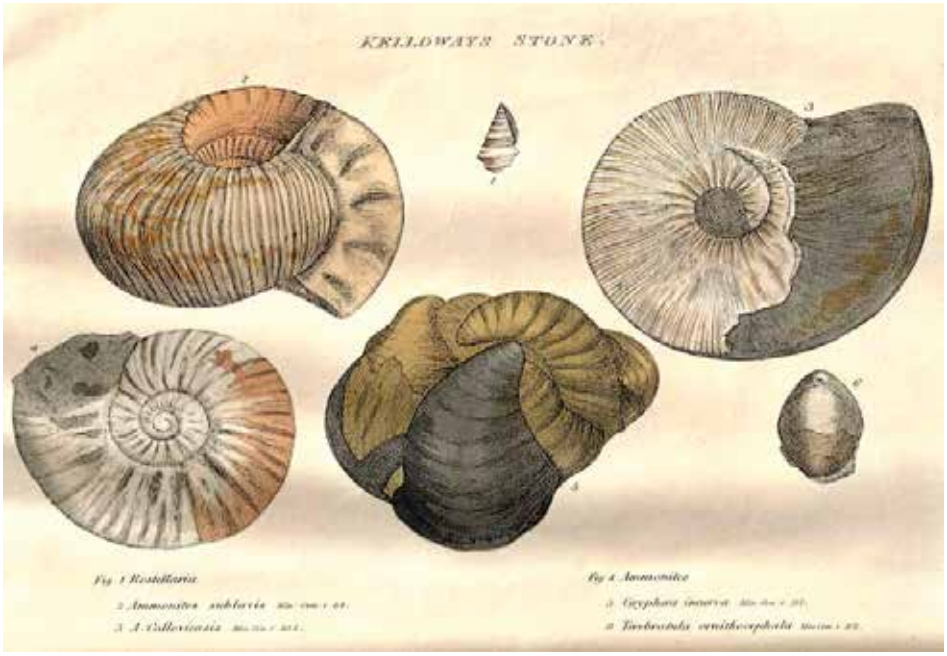
Smith's work impressed local landowners, who asked him to survey routes for the planned, double-branched Somerset Coal Canal (SCC), which would take coal barges to nearby cities like Bath and Bristol, and farther on to London. On a 1794 fact-finding tour of canal and colliery installations, Smith continued his embryonic geological investigations using the general appearance of the "lie of the land." Canal digging started in July 1795 along two sub-parallel valleys about two miles apart. Through this first widespread "surgery" of the countryside, excavations revealed to Smith a regular succession of gently dipping strata, which he could compare from one canal branch to the other. By late 1795, at the age of 26, Smith had worked out a local stratigraphic column, and on 5 Jan. 1796, he recorded his critical observation that some of the strata contained fossils, and that those fossils could be used to individualize, or identify, the strata. This realization allowed Smith to separate, for the first time, strata that had previously been hopelessly confused because of their shared lithologies—a major geological breakthrough. Smith's first such surviving list, from the "Chalk" (now Cretaceous) to the "Coal" (now Carboniferous) is dated 1797.

Smith's training as a land surveyor led him to realize that he could now color such strata onto maps, since he understood their thickness and dip, and thus their geometry. From 1799, he started both to map local strata and to show them on geological cross sections. While canal excavations provided Smith with valuable geological data, however, by 1799 there were more practical and immediate construction problems. The SCC had decided to use a "caisson" canal lift, but the first one failed, and after disagreement over its fate, Smith was dismissed in June 1799. Immediately afterward, Smith dictated to two Bath clerical friends an improved "Order of the Strata round Bath," which was widely disseminated in manuscript. In June 1801, he issued a prospectus for his intended book, *Accurate delineations and descriptions of the natural order of the various strata that are found in different parts of England and Wales.* Smith knew that his stratigraphic ideas held great economic potential, since they revealed where to find coal, iron, clay, and other minerals so vital to British industrialization.

Smith now set up a partnership with Jeremiah Cruse as land surveyors in Bath, which proved a fortunate location because so many landed gentry holidayed there. Between 1802 and 1805, in the Bath shop, Smith publicly displayed his fossil collections in stratigraphic order. From 1800 on, he also traveled in search of both commissions and data concerning the ordering of strata farther afield in the British Isles. Smith's life was now highly itinerant and financially precarious. At various sites throughout England and Wales, to stay solvent, he worked as a land and mineral surveyor, a drainer, a coal explorationist, a sea-defense builder, a harbor improver, and a canal surveyor. The difficulty of combining writing with so much traveling meant that Smith was only able to publish one book during this period, *Water Meadows* (1806), on draining bogs for practical use, but its publication was unprofitable.

Smith's work brought him into close contact with the polymath John Farey, who was so impressed with its novelty and economic importance that in early 1802, he brought Smith's work to the

Smith's *A Delineation of the Strata of England and Wales, with Part of Scotland*, published in September 1815. Image courtesy British Geological Survey as a one-time-only reproduction: British Geological Survey copyright permit no. CP15/050, © NERC. All rights reserved.



The "Kelloways Stone" plate from *Strata identified by Organized Fossils,* part 3, September 1817, by William Smith, mineral surveyor. These Kelloways fossils had allowed Smith, in 1805, to determine that the expensive Bruton Coal Trial of 1803–1810 would prove both misplaced and futile.

attention of the president of the Royal Society, Sir Joseph Banks. Attempts at early publication of Smith's stratigraphic work were foiled by his prospective publisher's bankruptcies, so in 1804 Banks opened a subscription toward publication of Smith's geological map, but the subscription drew only one other supporter. Nevertheless, in 1803 Smith had established a London office, and beginning in 1805 he displayed his ordered fossil collections there on shelves corresponding to the strata. On 24 March 1805, in a most significant first, Smith was able to inform those hunting coal near Bruton in Somerset that they were wasting time and money because they had been misled by superficial similarities into digging where no coal could be reached.

From 1806, and following Banks' support for map publication, Farey began to extol Smith's work in several magazines. Smith continued to add specimens from new strata to his increasingly large collection of the "characteristic" fossils he found in England. The Geological Society of London was founded in late 1807, but many of its members remained unconvinced of the value of Smith's work and rather proposed to publish a rival map! By 1810, they were ostracizing Farey for his outspoken support of Smith. Finally, in 1812, the London mapmaker John Cary offered to publish Smith's map, with specially engraved plates for which Smith designed topographic details. The first version was published in September 1815, dedicated to Banks, who had immediately realized the economic significance of Smith's results. This map was continually modified until at least 1818, and copies with mid-1830s watermarks survive.

By 1815, Smith was in serious financial trouble, and in June 1819 he was imprisoned for debt, spending almost ten weeks in the King's Bench prison in London. Smith's financial difficulties were broadly due to "laissez-faire" policies, with a critical lack of governmental support for work like his. However, the immediate cause of Smith's imprisonment was an unfortunate investment in a quarrying concern. The disaster was only partially assuaged between 1815 and 1818 by enforced sale of his wonderful fossil collections, at Banks' instigation, to an uninterested British Museum. Smith's library also had to be sold; only some of his personal papers were rescued by a friend.

Smith's achievements were enormous. His 1815 map helped inspire the French government to fund an equivalent mapping project. J.-F. d'Aubuisson de Voisins wrote in 1819 "what it has taken the most eminent mineralogists half a century to achieve in a small area of Germany, one man has undertaken and accomplished single-handed for the whole of England; and his work is quite as fine in its results as it is astounding in its scope."

Smith in later life finally received some recognition of his pioneering work, including the first Wollaston Medal of the Geological Society of London (1831), which 146 years later named after Smith its medal for excellence in contributions to applied and economic aspects of geology. The methods Smith developed are a fundamental underpinning of biostratigraphy and a basis of every student's field mapping exercise to the present day.

FURTHER READING

Online gateway to Smith's maps and much more: **www.strata-smith.com.**

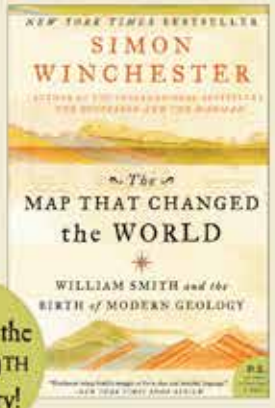
d'Aubuisson de Voisins, J.-F., 1819, Traité de géognosie, ou exposé des connaissances actuelles sur la constitution physique et minérale du globe terrestre: Strasbourg, F.G. Levrault, 2 vol., in-8, pl. d-rel.. 665 p.

Phillips, John, 1844, Memoirs of William Smith LL.D.: London, Murray (reprinted in 2003 with additions by Hugh Torrens by the Bath Royal Literary and Scientific Institution), 288 p.

Torrens, H.S., 2004, William Smith, Oxford Dictionary of National Biography: http://www.oxforddnb.com.

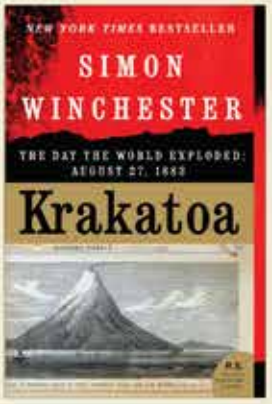
The "Rock Stars" series is produced by GSA's History and Philosophy of Geology Division. Learn more at www.gsahist.org/notices/HIST_RSGuide_revised_12-13.pdf.

EXPLORE THE WORLD WITH SIMON WINCHESTER

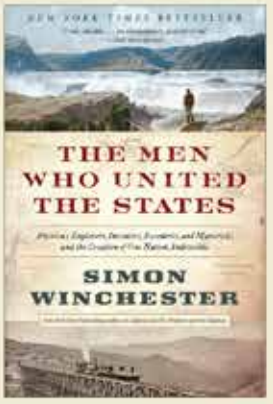


Celebrate the map's 200TH anniversary!

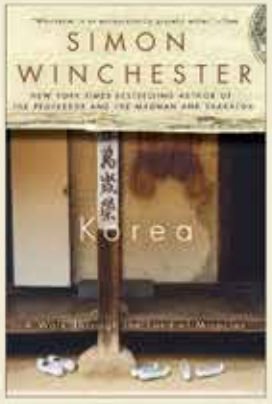
The Map That Changed the World
$14.99 / $18.50 CAN



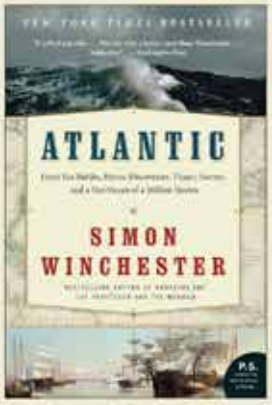
Krakatoa
$16.99 / $21.00 CAN



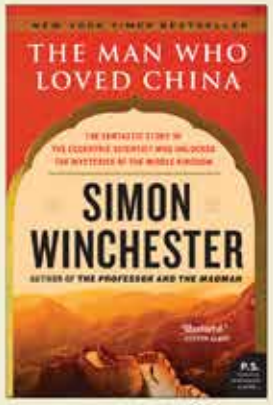
The Men Who United the States
$16.99 / $21.00 CAN



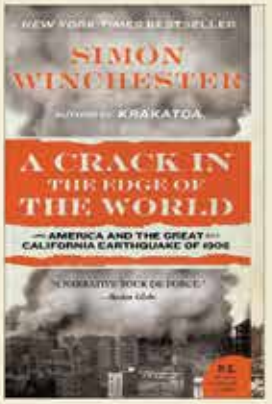
Korea
$15.99 / $19.99 CAN



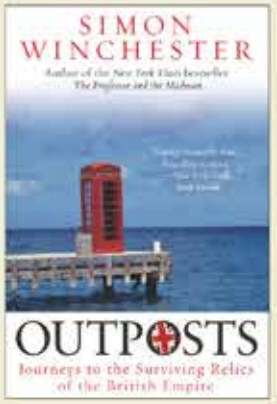
Atlantic
$15.99 / $19.99 CAN



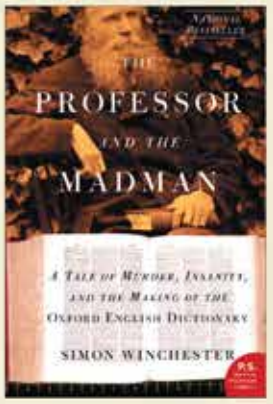
The Man Who Loved China
$15.99 / $19.99 CAN



A Crack in the Edge of the World
$15.99 / $19.99 CAN



Outposts
$14.99 / $18.50 CAN



The Professor and the Madman
$15.99 / $19.99 CAN

HARPER PERENNIAL

Preliminary Announcement and Call for Papers

SOUTH-CENTRAL SECTION

50th Annual Meeting of the South-Central Section, GSA
Baton Rouge, Louisiana, USA
21–22 March 2016

www.geosociety.org/Sections/sc/2016mtg/

The Horace Wilkinson Bridge in Baton Rouge.

Baton Rouge is located on the banks of the Mississippi River just upstream from the famous delta that is building out into the Gulf of Mexico. The region is a classic area for the study of fluvial sedimentology, coastal geology, as well as hydrocarbon systems and salt tectonics. The region is strongly affected by hurricane systems from the Gulf of Mexico, as well as by recent sea-level rises that endanger fragile wetlands in the delta and lower river reaches.

CALL FOR PAPERS

Abstract deadline: 15 Dec. 2015

Submit online at **www.geosociety.org/sections/sc/2016mtg/.**

Abstract submission fee: US$15 for students and US$20 for all others. If you cannot submit an abstract online, please contact Heather Clark, +1-303-357-1018, hclark@geosociety.org. Please check **www.geosociety.org/sections/sc/2016mtg/** for descriptions and the most current listing of technical sessions.

Symposium

S1. **Fossil Vertebrates from the Gulf Coastal Plain.** Judith Schiebout, Louisiana State University, jschie@lsu.edu; Gary Stringer, University of Louisiana at Monroe, stringer@ulm.edu.

Theme Sessions

T1. **Climate Change in the Gulf Coast Region: Past, Present, and Future.** Brian Schubert, University of Louisiana at Lafayette, schubert@louisiana.edu; Grant Harley, University of Southern Mississippi, grant.harley@usm.edu.

T2. **Flow through Carbonate Aquifers and Reservoirs.** Carol Wicks, Louisiana State University, cwicks@lsu.edu.

T3. **Big Geoscientific Problems in the South-Central Region.** Robert J Stern, Univ. of Texas at Dallas, rjstern@utdallas.edu; Kevin Mickus, Missouri State University, kevinmickus@missouristate.edu; Raphael Gottardi, University of Louisiana at Lafayette, rxg0121@louisiana.edu.

T4. **The Geochemistry of Sedimentary Systems.** David Borrok, University of Louisiana at Lafayette, dborrok@louisiana.edu; Achim Hermann, Louisiana State University, aherrmann@lsu.edu.

T5. **Petroleum Geology of the Gulf of Mexico.** Peter D. Clift, Louisiana State University, pclift@lsu.edu.

T6. **Geochemistry and Water Quality of Gulf Coast Groundwaters.** Karen Johannesson, Tulane University, kjohanne@tulane.edu; Ningfang Yang, Tulane University, nyang@tulane.edu.

T7. **Subsidence, Accretion: Coastal Depletion?** Christopher Esposito, Tulane University, cesposit@tulane.edu; Elizabeth L. Chamberlain, Tulane University, echambe1@tulane.edu; Krista L. Jankowski, Tulane University, kjankows@tulane.edu.

T8. **Hazards Related to Induced Earthquakes.** Randel T. Cox, University of Memphis, randycox@memphis.edu; Arleen A. Hill, University of Memphis, aahill@memphis.edu; Jian Chen, University of Louisiana at Lafayette, jchen@louisiana.edu.

T9. **Coastal and Shelf Sediment Transport Processes and Products of the Northern Gulf of Mexico.** Sam Bentley, Louisiana State University, sjb@lsu.edu; Kehui Xu, Louisiana State University, kxu@lsu.edu; Jeff Obelcz, Louisiana State University, jobelc1@lsu.edu; Jiaze Wang, Louisiana State University, jwang72@lsu.edu; Crawford White, Louisiana State University.

T10. **Fluvial Forms and Processes with Special Focus on Gulf Coast Rivers.** Kory Konsoer, Louisiana State University, kkonsoer@lsu.edu; Jeff Nittrouer, Rice University, nittrouer@rice.edu; Inci Güneralp, Texas A&M, iguneralp@geos.tamu.edu.

T11. **Toward Sustainable Water Systems: Impacts of Climate Variability and Changing Demands.** Emad Habib, University of Louisiana at Lafayette, habib@louisiana.edu; Ning Zhang, McNeese State University, nzhang.mcneese@gmail.com; Robert Miller, C.H. Fenstermaker & Associates, robert@fenstermaker.com.

T12. **Computational Geosciences and Data Visualization.** Margarete Jadamec, University of Houston, mjadamec@central.uh.edu; Matthew Knepley, Rice University, kneply@rice.edu; M. Burak Yikilmaz, University of California Davis, mbyikilmaz@ucdavis.edu.

T13. **Salt-Water Intrusion.** Doug Carlson, Louisiana Geological Survey, dcarlson@lsu.edu.

POST-MEETING WORKSHOPS

Big Geoscientific Problems in the South-Central Region.
Organizers: Robert J. Stern, Univ. of Texas at Dallas, rjstern@utdallas.edu; Kevin Mickus, Missouri State Univ., kevinmickus@missouristate.edu; Raphael Gottardi, Univ. of Louisiana Lafayette, rxg0121@louisiana.edu.

This workshop is intended to complement the session "Big Geoscientific Problems in the South-Central region." Geoscientists who want to participate in the workshop are encouraged to submit a presentation to that session, although it is not required.

Evolution of the Early Earth—The Rock Record from the Barberton Greenstone Belt of Early Life, Giant Impacts, and Very Hot Volcanism.
Instructor: Gary R. Byerly, Louisiana State Univ., glbyer@lsu.edu. Limited to 12 persons.

This workshop will be four hours of examination of thin sections, rock slabs, maps, and field photos.

PRE-MEETING FIELD TRIPS

1. **Miocene Vertebrates in the Pascagoula Formation: A Site Yielding Mastodon to Marine Turtle Material.** 20 March. Principal organizer: Judith A. Schiebout, jschie@lsu.edu. Co-organizers: Samuel Bentley, sjb@lsu.edu; Paul V. Heinrich, heinric@lsu.edu.
2. **Quaternary and Recent Sedimentation in the Wax Lake Delta.** 20 March. Principal organizer: Harry Roberts, hrober3@lsu.edu.
3. **Water Flow, Sediment Flux, and Boat Traffic between the Mississippi and Atchafalaya Rivers.** 20 March. Principal organizer: Gary Kinsland, gkinsland@louisiana.edu.
4. **Environmental Impacts of a Giant Gasoline Spill.** 20 March. Principal organizer: Bill Schramm, bill.schramm@la.gov.

REGISTRATION

Early registration deadline: 16 Feb. 2016
Cancellation deadline: 22 Feb. 2016

Registration opens in December 2015. For further information or if you need special accommodations, please contact Peter Clift, pclift@lsu.edu.

ACCOMMODATIONS

Hotel registration deadline: 29 Feb. 2016

A block of rooms has been reserved at the Hilton Baton Rouge Capital Center, 201 Lafayette Street, Baton Rouge, LA 70801, USA. Reservations can be made by calling +1-225-344-5866. In order to receive the special rate, please mention that you are attending the GSA South-Central Meeting.

LOCAL CONTACTS

Coordinating Chair: Peter Clift, Louisiana State University, pclift@lsu.edu

Technical Chair: David Borrok, University of Louisiana Lafayette, dmb5953@louisiana.edu

Exhibits Chair: Carl Richter, University of Louisiana Lafayette, richter@louisiana.edu

Field-Trip Chair: Tara Jonell, Louisiana State University, tjonel1@lsu.edu

Student Coordinator: Adam Turner, Louisiana State University, aturn49@lsu.edu

Preliminary Announcement and Call for Papers

NORTHEASTERN SECTION

51st Annual Meeting of the Northeastern Section, GSA
Albany, New York, USA
21–23 March 2016

www.geosociety.org/Sections/ne/2016mtg/

Thatcher Park. Photo courtesy of Albany County Convention & Visitors Bureau.

In the midst of it all… slices through space and time.

Albany, New York, USA, is centrally located on the historic Hudson River, where the Appalachian Mountains meet the Allegheny Plateau and the Valley and Ridge province nudges up to the Taconic and Adirondack Mountains. From Paleozoic shelf strata and complexly metamorphosed Precambrian bedrock to Mesozoic rift basins and Pleistocene glacial cover, the fascinating transect from Buffalo to Boston leads right through Albany.

We'll meet in the Albany Convention Center, located in the heart of revitalized downtown Albany, and adjacent to the beautiful New York State House and the New York State Museum. Numerous affordable lodging opportunities and a wide variety of restaurants, coffee shops, bars, and brew pubs are within easy walking distance of the convention center.

CALL FOR PAPERS

Abstract deadline: 8 Dec. 2015
Submit online at **www.geosociety.org/sections/ne/2016mtg/**

Abstract submission fee: US$15 for students and US$20 for all others. If you cannot submit an abstract online, please contact Heather Clark, +1-303-357-1018, hclark@geosociety.org. Please check **www.geosociety.org/sections/ne/2016mtg/** for descriptions and the most current listing of technical sessions.

Symposia

S1. **Applications of Geochemistry and Geochronology to Understanding Tectonic Processes: In Honor of Raymond A. Coish.** David P. West, Jr., Middlebury College, dwest@middlebury.edu; Peter Ryan, Middlebury College, pryan@middlebury.edu; Jonathan Kim, Vermont Geological Survey, jon.kim@state.vt.us.

S2. **Timing and Nature of Deformation in the Adirondack Mountains.** Mike Williams, Univ. of Massachusetts, mlw@geo.umass.edu; Jeff Chiarenzelli, St. Lawrence Univ.; Tim Grover, Castleton State College.

Theme Sessions

T1. **Insights from Microfossils, from Terrestrial to Marine Environments (Posters).** Miriam Katz, Rensselaer Polytechnic Institute, katzm@rpi.edu; Chiara Borrelli, Univ. of Rochester, cborrelli@ur.rochester.edu; Samuel Bowser, Wadsworth Center, New York State Dept. of Health, samuel.bowser@health.ny.gov.

T2. **High-Resolution Records of Holocene Climate Change.** Eugene Domack, College of Marine Science, Univ. of South Florida, edomack@usf.edu; Amy Leventer, Geology Department, Colgate Univ., aleventer@colgate.edu.

T3. **Tropical Climate and Paleoclimate.** Alice Doughty, Dartmouth College, alice.m.doughty@dartmouth.edu; Meredith A. Kelly, Dartmouth College; Margaret Jackson, Dartmouth College.

T4. **Glacial Landscapes as Recorders of Geomorphic Process and Climate Change.** Lee Corbett, Univ. of Vermont, ashley.corbett@uvm.edu; Jeremy Shakun, Boston College; Aaron Putnam, Univ. of Maine, aaron_putnam@umit.maine.edu.

T5. **Marine and Terrestrial Coastal Mapping: Data, Discovery, and Science.** Mark Borrell, Univ. of Massachusetts Boston, mark.borrelli@umb.edu; Bryan Oakley, Univ. of Massachusetts Boston.

T6. **Integrating Structural Geology with Hydrogeology.** Edwin Romanowicz, State Univ. of New York at Plattsburgh, romanoea@plattsburgh.edu; Jonathan Kim, Vermont Geological Survey.

T7. **Interaction between the Landscape and Aquatic Biogeochemistry.** Andrew Vermilyea, Castleton State College, andrew.vermilyea@castleton.edu; Andrew Schroth, Univ. of Vermont.

T8. **Integrating Complementary Records of Paleozoic Orogenies in the Appalachians: Bridging the Foreland and Hinterland.** Paul Karabinos, Williams College, pkarabin@williams.edu; Francis Macdonald, Harvard Univ., fas.harvard.edu; Charles E. Mitchell, SUNY Buffalo,

cem4graps@gmail.com; Charles A. Ver Straeten, New York State Museum, charles.verstraeten@nysed.gov.

T9. **New Perspectives on the Use of Structural Analysis to Solve Tectonic Problems: Examples from Slices through Space and Time in Northeastern North America.** *Cosponsored by GSA Structural Geology and Tectonics Division.* Jean Crespi, Univ. of Connecticut, jean.crespi@uconn.edu; Keith Klepeis, Univ. of Vermont, keith.klepeis@uvm.edu.

T10. **Pegmatites: Most Evolved Components of the Continental Crust.** Paul Tomascak, SUNY, Oswego, tomascak@oswego.edu; Marian Lupulescu, New York State Museum.

T11. **Interpretation of Quaternary Environments: Through Geology, Paleontology, and Archaeology in the Glaciated Great Lakes and New England.** Andrew Kozlowski, New York State Museum/Geologic Survey, andrew.kozlowski@nysed.gov; Robert Feranec, New York State Museum, robert.feranec@nysed.gov.

T12. **A New Look at Terrane Affinity of Old Rocks in Western New England: Peri-Laurentian or Peri-Gondwana?** Craig Dietsch, Univ. of Cincinnati, dietscc@ucmail.uc.edu; Bob Wintsch, Indiana Univ., wintsch@indiana.edu.

T13. **Teaching Geoscience Concepts Using Geospatial Tools.** John Van Hoesen, Green Mountain College, vanhoesenj@greenmtn.edu.

T14. **The Grenville-Age Low Ti-Fe Oxide Deposits from New York State: Igneous or Hydrothermal?** Phil Geer, Univ. of Massachusetts; Marian Lupulescu, New York State Museum, pgeer@geo.umass.edu; Peter Valley, Weatherford Laboratories.

T15. **Stratigraphy, Sedimentology, and Paleontology of the New York Paleozoic.** James Ebert, SUNY Oneonta, james.ebert@oneonta.edu; D. Jeffrey Over, SUNY Geneseo, over@geneseo.edu.

T16. **Deciphering the Devonian: Paleobiology, Stratigraphy, and Geochemistry.** Andrew M. Bush, Univ. of Connecticut, andrew.bush@uconn.edu; J. Andrew Beard, Univ. of Connecticut, james.beard@uconn.edu; Diana L. Boyer, SUNY Oswego, dboyer@oswego.edu.

T17. **Geophysical Methods in the Hydrogeologist's Toolbox.** Laura Lautz, Syracuse Univ., lklautz@syr.edu; Robin Glas, Syracuse Univ., rlglas@syr.edu; Zeno Levy, Syracuse Univ., zflevy@syr.edu.

T18. **Professional Licensing of Geologists in New York State: Where We've Been, Where We're Going.** Jim Ridenour, CPG, New York State Council of Professional Geologists, jim.ridenour@health.ny.gov.

T19. **Applications of Geologic Mapping to Address Geologic Hazards, Natural Resources, and Natural History Studies.** Andrew Kozlowski, New York State Museum/Geologic Survey, andrew.kozlowski@nysed.gov; Brian Bird, New York State Museum/Geological Survey, brian.bird@nysed.gov.

T20. **Radioactivity in the Environment.** John Garver, Union College, garverj@union.edu.

FIELD TRIPS

Geology & History of the Rosendale Cement Industry. Steven Schimmrich, SUNY Ulster County Community College, schimmrs@sunyulster.edu.

The Geology of Thacher Park: A Classic North American Geologic Site. Charles Ver Straeten, New York State Museum, charles.verstraeten@nysed.gov; Ed Stander, SUNY Cobleskill, standeej@cobleskill.edu; Thom Engel, Northeastern Cave Conservancy, necaver@earthlink.net.

Karst Hydrogeology of the Kingston-Rosendale Karst Aquifer Region within the Hudson Valley Fold-Thrust Belt. Paul A. Rubin, HydroQuest, hydroquest@yahoo.com; Kurtis C. Burmeister, Univ. of the Pacific, kburmeister@pacific.edu; Alexander Bartholomew, SUNY New Paltz, barthola@newpaltz.edu.

ACCOMMODATIONS

Hotel registration deadline: 22 Feb. 2016

A block of rooms has been reserved at the Hilton Albany for US$172 per night. In order to receive the special rate, please mention special code **1GEO.**

LOCAL CONTACTS

General Co-Chairs: Helen Mango, helen.mango@castleton.edu; Tim Grover, tim.grover@castleton.edu

Technical Program Co-Chairs: Don Rodbell, rodbelld@union.edu; Jacqueline Smith, smithj@mail.strose.edu

Field Trip Chair: John van Hoesen, vanhoesenj@greenmtn.edu

Short Course/Workshop Chair: Robert Badger, badgerrl@potsdam.edu

GSA Members in the News

GSA Fellow **Marcia K. McNutt,** editor-in-chief of the *Science* family of journals and former USGS director, has been elected president of the National Academy of Sciences. She will begin her term in July 2016.

GSA Fellow **Richard C. Berg** has been appointed director of the Illinois State Geological Survey and the 13th Illinois State Geologist. Berg has served as interim director since May 2014 and was previously chief scientist. He has led numerous multidisciplinary groups at the ISGS during his 40-year career and has made significant contributions to the discipline through his leadership in GSA.

STEPPE Workshop Program Funds Three New Projects

The STEPPE Workshop Program has awarded funding for three new workshops. The workshops are highly different in topic, though all will bring together researchers from different fields to collaborate and discuss disciplines of interest to the STEPPE community, and to develop multi-investigator proposals for external funding. We are looking forward to working with these groups and seeing the success of the projects.

EXPERIMENTAL DATA AND DYNAMICS OF DELTAS AND MARGINS

Steven Goodbred, Ryan Sincavage, Rip Hale, and Jennifer Pickering (from Vanderbilt University), will team with Kyle Straub (Tulane University), Paola Passalacqua (University of Texas at Austin), and Carol Wilson (Louisiana State University) to host the workshop "ONE-Delta—Synthesizing Observational, Numerical, and Experimental data to unravel the complex dynamics of deltas and margin sequences."

The workshop will bring together experts in field studies, numerical modeling, theory, and experimentation to develop plans for integrated NSF-style proposals aimed at a deeper understanding of processes that govern cross-margin sediment dispersal, construction of deltaic landscapes, and resulting geological-scale stratigraphy and basin successions.

"Large river deltas and their adjacent margins are defined by the dispersal and accumulation of sediment, which construct rich landscapes supporting major human population centers, economic resources, and biodiversity," the proposal explains.

"By their nature, these densely populated environments are spatially and temporally dynamic and respond sharply to perturbations and change, whether via natural or anthropogenic sources, and their sediments represent an archive of environmental change through time."

GREENHOUSE PRECIPITATION EXTREMES

Piret Plink-Bjorklund (Colorado School of Mines) will lead "Increased precipitation extremes in greenhouse conditions; An integrated paleoclimate and anthropogenic perspective." This workshop will bring together researchers in sedimentology, paleobiology, paleoclimatology, biogeochemistry, and others who aim to integrate geologic data and climate models of past global warming events with those of anthropogenic climate change.

The proposal hypothesizes that "the increase in extreme precipitation in the subtropics and mid-latitudes is likely to be a significant, long-term principal effect of both anthropogenic and ancient global warming events, and that it is related to Hadley cell circulation changes. This idea rises from recent research on ancient river morphodynamics that provides a new proxy for assessing extreme precipitation and seasonal and inter-annual precipitation variability from the ancient record."

With model and data comparison, researchers can assess which current and predicted extreme precipitation intensification should be expected to be long term and linked to anthropogenic global warming.

SEDIMENT SOURCES AND SINKS IN LAKE TANGANYIKA

Michael McGlue (University of Kentucky) and Christopher Scholz (Syracuse University) will host "Lake Tanganyika: A Miocene-Recent Source-to-Sink Laboratory in the African Tropics." The workshop will bring together interdisciplinary experts to examine Lake Tanganyika (East Africa) as a natural source-to-sink laboratory, and to provide a framework for new collaborative research proposals.

Lake Tanganyika is considered a premier location to recover a long-term, high-resolution record of tropical climate, evolutionary biology, and rift tectonics through scientific drilling. It is also an active frontier petroleum basin.

"Studying these deposits has the potential to transform what we know about the evolution of climate and environments in the African tropics from the Miocene–present," McGlue states. "Our team (geologists, paleoclimatologists, and paleobiologists) is deeply committed to collecting long scientific drill cores from the lake in the future, but prior to doing that, we need to advance our understanding of the source-to-sink continuum that shapes the basin's stratigraphy."

True-color image of the Mississippi River delta and sediment plume. Credit: MODIS, NASA.

SOIL SCIENCE

An Interdisciplinary Approach to Soils Research

Order Today and Save 25%

Soilsci.com

In a world increasingly conscious of the limits of its natural resources,

Soil Science occupies a prominent position in the fight against a broad spectrum of environmental, economic, and social dilemmas. Every month, Soil Science presents authoritative research articles from an impressive array of disciplines: soil chemistry and biochemistry; physics; fertility and nutrition; soil genesis and morphology; and soil microbiology and mineralogy.

Access Anywhere—Print, Mobile, or Online!

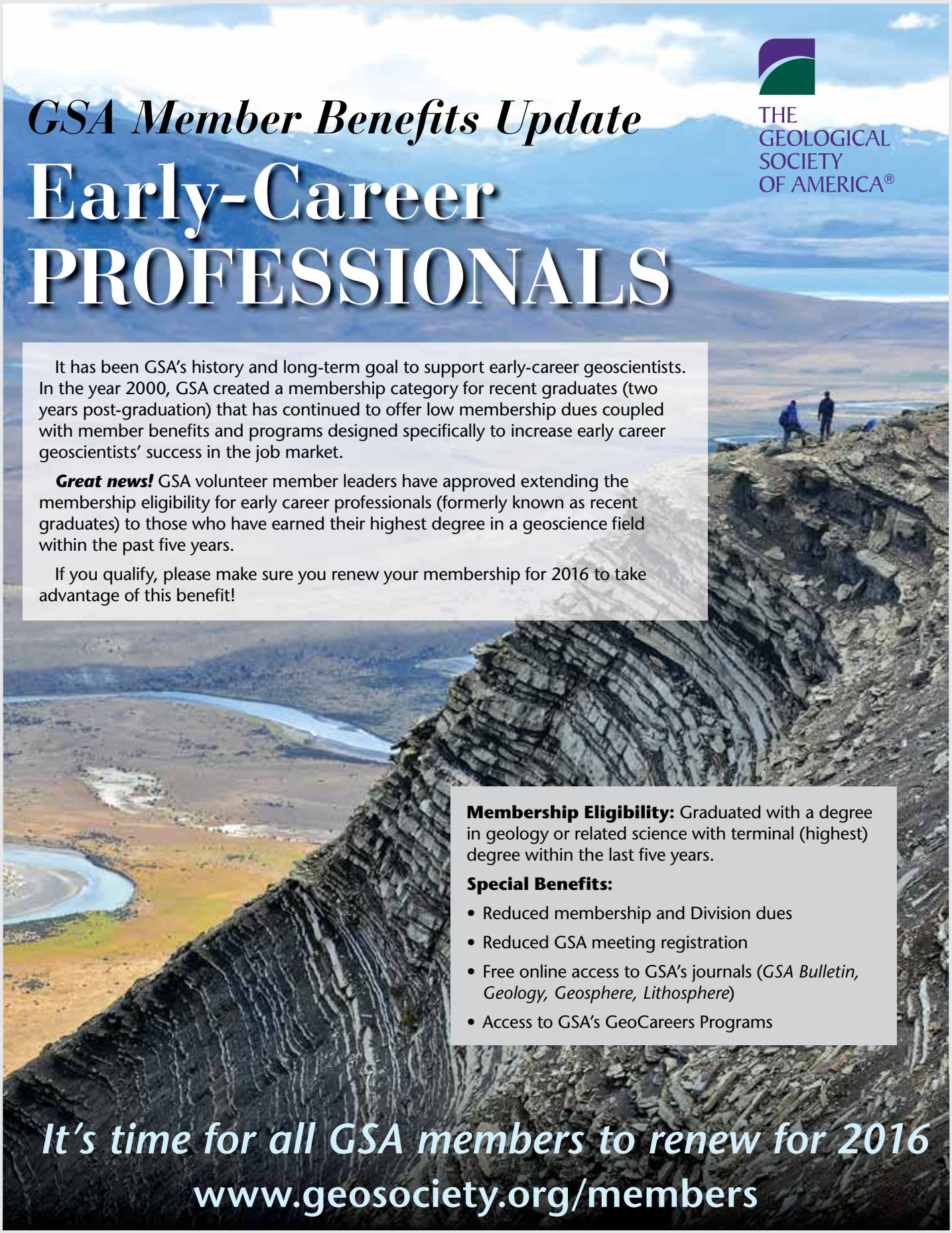
Your subscription includes full online access to all current and past issues at the ***Soil Science*** website. Take advantage of enhanced search options, personal article collections, tools to help you easily export and email content, and more!

Order online at LWW.com to receive 25% off of your subscription

Enter Promo Code WFQ581ZA (U.S.), WFQ581ZB (CAN), or WFQ581ZC (INT) at checkout

Wolters Kluwer

5-Q581



GSA Member Benefits Update

Early-Career PROFESSIONALS

THE GEOLOGICAL SOCIETY OF AMERICA®

It has been GSA's history and long-term goal to support early-career geoscientists. In the year 2000, GSA created a membership category for recent graduates (two years post-graduation) that has continued to offer low membership dues coupled with member benefits and programs designed specifically to increase early career geoscientists' success in the job market.

Great news! GSA volunteer member leaders have approved extending the membership eligibility for early career professionals (formerly known as recent graduates) to those who have earned their highest degree in a geoscience field within the past five years.

If you qualify, please make sure you renew your membership for 2016 to take advantage of this benefit!

Membership Eligibility: Graduated with a degree in geology or related science with terminal (highest) degree within the last five years.

Special Benefits:

- Reduced membership and Division dues
- Reduced GSA meeting registration
- Free online access to GSA's journals (*GSA Bulletin, Geology, Geosphere, Lithosphere*)
- Access to GSA's GeoCareers Programs

It's time for all GSA members to renew for 2016

www.geosociety.org/members

Eastward-Dipping Turbidites, Magallanes Foreland Basin, Chile. Photo by Zoltan Sylvester.

Do you have a group of topical papers that you dream of seeing in a GSA book?

Or a pithy yet mind-blowing manuscript looking for a journal?

Your latest research will find the right fit at GSA.

rock.geosociety.org/store

GSA BOOKS

Special Papers and **Memoirs** are two of the book series published by GSA. Volumes in these series are:

- peer-reviewed
- published quickly after acceptance
- online ahead of print
- distributed worldwide (print + online)
- included in the Thomson Reuters Book Citation Index

Science Editors:

- **Kent Condie** New Mexico Institute of Mining and Technology
- **Richard A. "Skip" Davis Jr.** Harte Research Institute, Texas A&M University

Details: **www.geosociety.org/pubs/bookguid.htm**.
Submit your proposal to **books@geosociety.org**.

MAKE AN IMPACT: Publish with GSA

THE GEOLOGICAL SOCIETY OF AMERICA®

JOURNAL	Impact Factor 2015	Impact Factor 5-YEAR	SUBMIT ONLINE
GSA Bulletin	3.870	4.634	www.editorialmanager.com/gsabulletin
Geology	4.884	4.962	www.editorialmanager.com/geology
Geosphere	2.012	2.652	www.editorialmanager.com/geosphere
Lithosphere	3.013	2.743	www.editorialmanager.com/lithosphere
E&EG	0.977	0.824	http://eeg.allentrack.net/cgi-bin/main.plex

FREE SAMPLE ISSUES: www.gsapubs.org/site/misc/free-journals.xhtml

TOP-RATED JOURNALS

GSA journals publish scientific papers on all aspects of earth science, with science editors at the forefront of their fields overseeing a rigorous peer-review process for all manuscripts. Pre-issue publication online gets your accepted paper into circulation quickly.

GSA Bulletin—Published since 1890 and still going strong.

- #12 ranked "geosciences, multidisciplinary" journal by ISI

Geology—Measure your success with a paper accepted into this highly regarded journal.

- #1 ranked "geology" journal by ISI

Geosphere—Branch out unfettered with free color and a chance to bring animations and interactivity to your papers.

Lithosphere—Focuses on processes that affect the crust, upper mantle, landscapes, and sedimentary systems at all spatial and temporal scales.

Environmental & Engineering Geoscience—Explores the interaction of people with hydrologic and geologic systems.

www.gsapubs.org

Geoscience Jobs & Opportunities

Ads (or cancellations) must reach the GSA advertising office no later than the first of the month, one month prior to the issue in which they are to be published. Contact advertising@geosociety.org, +1.800.472.1988 ext. 1053, or +1.303.357.1053. All correspondence must include complete contact information, including e-mail and mailing addresses. To estimate cost, count 54 characters per line, including punctuation and spaces. Actual cost may differ if you use capitals, boldface type, or special characters. Rates are in U.S. dollars.

Classification	Per Line for 1st month	Per line each addt'l month (same ad)
Positions Open	$9.15	$8.90
Fellowship Opportunities	$9.15	$8.90
Opportunities for Students		
First 25 lines	$0.00	$5.00
Additional lines	$5.00	$5.00

Positions Open

ASSISTANT PROFESSOR
SEDIMENTARY GEOLOGY/PALEOCLIMATE
OCCIDENTAL COLLEGE

The Dept. of Geology at Occidental College invites applications for an Assistant Professor in sedimentary geology with a research focus in paleoclimate, paleoenvironmental change, and/or fluvial - coastal processes. Occidental is a nationally ranked liberal arts college recognized for its diverse student body and outstanding undergraduate research program. We seek a colleague who values undergraduate teaching and can sustain an active research program involving undergraduates. In addition to courses related to specialty, the successful candidate will contribute to teaching introductory geology, support the Environmental Science concentration, engage undergraduates in research, and mentor students through completion of senior theses.

Applications should include a statement of teaching and research interests in the context of a liberal arts college. Candidates should specifically address their ability to (1) teach in a socioeconomically, ethnically and culturally diverse environment, and (2) engage students in an ongoing research program. Submit statement, curriculum vitae, 1–3 significant publications, and contact information for three referees to Dr. Margi Rusmore, Search Committee Chair, at geosearch1@oxy.edu. Members of underrepresented groups are especially encouraged to apply. Review of applications will begin October 15, 2015, and will continue until the search closes on December 22, 2015. **Search committee members will meet interested candidates at the GSA and AGU meetings; email the committee to make arrangements.**

TWO TENURE-TRACK ASSISTANT PROFESSORS
AND FULL PROFESSOR DEPARTMENT CHAIR
ENVIRONMENTAL GEOSCIENCES
CENTRAL MICHIGAN UNIVERSITY

The Dept. of Earth and Atmospheric Sciences (EAS) seeks candidates who use a combination of fieldwork, large data set analysis, and modeling to address environmental problems. Preference will be given to candidates with expertise in one or more of the following areas: biogeochemical cycling, stable isotope geochemistry, land/atmosphere interactions, sedimentology/geomorphology, the use of geophysical techniques in environmental research, and other areas of environmental science pertinent to the Great Lakes region.

Classified by the Carnegie Foundation as a doctoral research university, CMU is recognized for strong undergraduate education and a range of focused graduate and research programs. EAS offers B.S. degrees in meteorology and geology, participates in the interdisciplinary Ph.D. degree in Earth and Ecosystem Science, and has recently established a B.S. degree in Environmental Science. Successful candidates will be expected to contribute to undergraduate programs, enhance graduate education by actively supervising Ph.D. candidates, and become active members of the Institute for Great Lakes Research.

Two Assistant Professors: Candidates should have a record of publishing in quality journals and have a commitment to excellence in undergraduate teaching and graduate education. Successful applicants will be expected to develop and maintain an externally funded research program. The initial teaching load will be 3 courses per academic year, for up to 5 years based on satisfactory progress towards establishing a funded research program.

Department Chairperson: Candidates should have an outstanding record of publishing and external funding as well as strong evidence of effective leadership in an academic setting. The successful applicant will be expected to develop and maintain an externally funded research program. The successful candidate will use a multidisciplinary approach to research, demonstrate excellent interpersonal and communication skills, provide a vision for strengthening the department, and oversee the launch of the environmental science program. Additional responsibilities include teaching 2 courses per academic year.

Review of applications begins September 15, 2015, and continues until the positions are filled. Applications must be submitted through www.jobs.cmich.edu. CMU is an AA/EO institution, providing equal opportunity to all persons, including minorities, females, veterans, and individuals with disabilities (see www.cmich.edu/ocrie).

VISITING ASSISTANT PROFESSOR
OF GEOLOGY, ENERGY
ALLEGHENY COLLEGE

The Geology Department at Allegheny College invites applicants for a four-year appointment (subject to a satisfactory performance review in the second year), with a start date of January 2016. A Ph.D. is preferred at the time of appointment but strong ABD candidates will be considered. There is the potential for conversion of the position to a tenuretrack contract after the four-year appointment. We seek a geoscientist with teaching and/or research interests in an energyrelated field to develop and teach a new introductory energy course and to help us shape a new interdisciplinary minor in energy and society. Our vision for the position is to have someone move beyond traditional petroleum geology and help develop a curriculum related to fossil fuels as a stepping stone to future sustainable energy. Successful candidates will have a strong commitment to liberal arts undergraduate education and will work as part of a small and active departmental team. Previous internships and/or work in the energy industry is an asset, as is prior teaching experience. The appointee will advise and work closely with undergraduate students in course work and advising, including senior research projects, and will provide evidence of excellence in teaching and ongoing scholarship. Other teaching will include introductory environmental geology, college wide firstyear/sophomore seminars, and/or other advanced geology courses based on the expertise of the candidate and needs of the department. The teaching load will typically involve two lab courses per semester.

Allegheny College is a highly selective private liberal arts college with a dedicated faculty of teacherscholars. The Dept. of Geology has a tradition of excellent undergraduate education and active involvement in studentfaculty research. Facilities include a computer lab with GIS software, a trailer mounted drill rig, Xray diffraction, ion and gas chromatography, Flame/Furnace AAS, JEOL SEMEDSCL, and well-equipped instructional labs. Applicants should send a letter of application, teaching statement, research statement, cv, transcripts, and have three letters of reference sent. All documents should be addressed to Energy Search, Department of Geology at Allegheny College and sent electronically to 2015GeoEnergySearch@allegheny.edu. Review of applications will begin October 19, 2015. More information on Allegheny College and the Dept. of Geology may be obtained at http://sites.allegheny.edu/geo/. Applicant must be authorized to work in the United States to be considered. Allegheny College is an Equal Opportunity Employer with a strong commitment to diversity, inclusion, and equity. Women, veterans, individuals with disabilities, and members of other underrepresented groups are highly encouraged to apply. Allegheny does not discriminate on the basis of race, color, religion, gender, gender identity, gender expression, sexual orientation, age, or national origin.

FACULTY POSITION, GEOPHYSICS
UNIVERSITY OF ARIZONA

The Dept. of Geosciences at the University of Arizona seeks applications for a tenure track faculty position in geophysics in the broad areas of geodynamics, seismology, and/or geodesy. Candidates must hold a Ph.D. degree by the time of appointment. Postdoctoral or other postgraduate research experience is desirable. We anticipate hiring at the tenure-track assistant professor level. The appointee is expected to develop and maintain a vigorous, collaborative, externally funded research program and to teach at the undergraduate and graduate level. Screening of applications will begin Sept. 10, 2015 and the search will continue until the position is filled. To apply, please submit: a cover letter, including references, curriculum vita, and statements of research and teaching experience and interests at this website: https://uacareers.com/postings/3687.

ASSISTANT PROFESSOR OF GEOSCIENCES, ENVIRONMENTAL GEOLOGY
PACIFIC LUTHERAN UNIVERSITY

The Dept. of Geosciences at Pacific Lutheran University invites applications for a tenure-track position in environmental geology at the level of Assistant Professor to begin September 1, 2016. A commitment to excellence in teaching at a predominately undergraduate institution and a dedication to establishing a field-based research program that engages students are expected. Teaching responsibilities will include hydrogeology, an upper division course in one's expertise, the gateway course for the major (GEOS 201), and topical lower division geoscience courses. Participation in extended field trip experiences, the general education program, and mentoring senior capstone research projects is also expected. Ph.D. in Geology or closely related field is required. ABD will be considered, but Ph.D. must be in hand by September 1, 2016.

PLU is a comprehensive university of 3500 students offering a curriculum integrating the liberal arts and professional programs. Located in a uniquely scenic region of the Pacific Northwest, the university's campus is 40 miles south of Seattle and 40 miles west of Mount Rainier near Tacoma, Washington. AA/EOE.

Submit application at http://employment.plu.edu/. Required materials: cover letter, c.v., statement of teaching philosophy, unofficial undergraduate and graduate transcripts, and potential research plans with undergraduates. Three confidential letters of recommendation will also be requested by PLU upon application. Review of applications will begin **October 1, 2015**, but the position will remain open until filled. For questions or more information, please contact Dr. Peter Davis, Search Committee Chair at +1-253-538-5770 or davispb@plu.edu.

TENURE-TRACK
GEOSCIENCE AND WATER SUSTAINABILITY
UNIVERSITY OF PITTSBURGH

The Dept. of Geology and Environmental Science seeks to expand its expertise related to water sustainability in a changing climate and invites applications for a tenure-track assistant professor pending budgetary approval. Given the recent, profound shifts in water balance and those anticipated in the near future, the Department seeks to develop capacity to understand these issues of regional, national and global importance. We are seeking a geoscientist with expertise in characterizing hydrologic changes associated with climatic shifts and developing adaptation strategies allowing society to sustainably adjust to these shifts. Our goal is to hire a colleague who uses a combination of field measurements and observations, remote sensing, and/or modeling to better understand water-climate-human interactions in the critical zone. Specific areas of interest could include, but are not limited to: catchment hydrology in urban, managed, and natural systems; land-atmosphere interactions; soil moisture analysis; the interacting roles of climate variability and land use change on hydrologic processes; or physical models of ecohydrologic and hydropedologic processes from the plot to the global scale. The successful candidate will complement existing research clusters and establish an externally- funded, internationally recognized research program. Teaching duties include undergraduate and graduate courses in the candidate's area of expertise. Review of applicants will begin on October 15, 2015 and continue until the position is filled. A Ph.D. is required at the time of appointment, with the position scheduled to begin in Fall 2016, subject to budgetary approval. Please apply online to: https://facultysearch.as.pitt.edu/apply/index/OTY=. Applications should include: (1) a cover letter; (2) a CV; (3) statements of research and teaching interests; (4) names and contact information of four references; and (5) copies of three relevant publications. Direct questions to the Search Committee Chair, Dr. Daniel Bain, dbain@pitt.edu, +1-412-624-8766. The University of Pittsburgh is an Affirmative Action/Equal Opportunity Employer and values equality of opportunity, human dignity and diversity. The University of Pittsburgh is the fifth largest recipient of federally sponsored research funding among U.S. universities and has $900 million in annual research and development expenditures. Located in an urban setting, the University campus offers easy access to potential research, teaching and outreach venues including the Carnegie Museum of Natural History, the Carnegie Science Center, several urban watersheds, and proximity to long-term experimental catchments (Fernow, West Virginia). Pittsburgh is experiencing a "green renaissance" and is consistently ranked among the top places to live, work, and visit in the U.S.

ASSISTANT PROFESSOR
MINERALOGY-PETROLOGY-EARTH MATERIALS
WEST VIRGINIA UNIVERSITY

The Dept. of Geology and Geography at West Virginia University seeks to hire a tenure track Assistant Professor specializing in Earth Materials. This could include expertise in Igneous, Metamorphic, Sedimentary or Organic Petrology, Mineralogy, Geomicrobiology or related fields. The successful candidate will be expected to develop a vigorous externally-funded research program, to teach core undergraduate classes covering the origins of rocks and minerals as well as graduate courses in the area of his/her expertise, and to mentor graduate students.

Requirements include a Ph.D. or equivalent doctoral degree in Earth Science or a closely related field by the start date, evidence of potential to establish a strong externally-funded research program, to publish in peer-reviewed journals, and to excel in teaching at the undergraduate and graduate levels.

Qualified applicants should: (1) submit a single PDF file including a statement of research interests, a statement of teaching philosophy, and a curriculum vitae; (2) submit PDF files of up to 3 publications; and (3) arrange for three letters of reference to be sent. All documents should go to earthmaterials@mail.wvu.edu.

Review of applications will begin Sept. 30, 2015 and continue until the position is filled. The anticipated start date is August of 2016.

For additional information, please see http://pages.geo.wvu.edu/earthmaterials or contact the search chair: Jaime Toro at earthmaterials@mail.wvu.edu or +1-304-293 9817.

West Virginia University is an EEO/Affirmative Action Employer and welcomes applications from all qualified individuals, including minorities, females, individuals with disabilities, and veterans.

STRUCTURAL GEOLOGIST
NEOTECTONICS, GEOLOGY
MISSOURI STATE UNIVERSITY

The Dept. of Geography, Geology and Planning invites applications for a tenure-track position in Geology at the rank of Assistant Professor to begin in either January 2016 or August 2016 with an emphasis in **either Structural Geology or Neotectonics**.

A Ph.D. (or ABD) in Geology or a closely related field is required at time of appointment. Requirements include a commitment to undergraduate- and Master's-level teaching as well as research expertise and interest at a level appropriate to supervise Master's-level thesis projects. The successful applicant will teach an undergraduate course in structural geology and one or more upper-level courses in his or her specialty. Additionally, the individual will also teach introductory-level geology courses, and participate in department-level field trips. Post-doctoral research experience and evidence of teaching effectiveness would be advantageous. Applicants must be able to demonstrate knowledge of and the ability to work in an environment that encourages an understanding of, respect for, and development of skills to engage with those of other cultures or diverse backgrounds.

The Department grants undergraduate degrees in Geology, Geography, Planning, Geospatial Science, and Earth Science Education and an M.S. in Geospatial Science in Geography, Geology and Planning. The successful applicant would be expected to teach and advise in the undergraduate program in Geology and in the department's graduate program.

Qualified applicants should apply online at https://jobs.missouristate.edu and upload a single PDF that includes a letter of application, current curriculum vitae, detailed research plan, statement of teaching philosophy, and contact information for 3–5 professional references. The evaluation of applications will begin September 15, 2015, and will continue until a successful candidate is found. Further information can be obtained at +1-417-836-5800 or visit our web site at http://geosciences.missouristate.edu. The University is dedicated to the goal of building a culturally diverse and inclusive faculty and staff committed to teaching and working in a multicultural environment and strongly encourages applications from women, persons from underrepresented ethnic and racial groups, individuals with disabilities and covered veterans. Employment will require a criminal background check at University expense. Missouri State University is an Equal Opportunity/Affirmative Action/Minority/Female/Veterans/Disability employer and institution.

TWO POSITIONS:
STRATIGRAPHY/SEDIMENTOLOGY
AND GEOMORPHOLOGY/CLIMATOLOGY
DENISON UNIVERSITY

Denison University invites applications for two tenure track positions in the Department of

Geosciences, to begin in August 2016. We seek broadly trained scientists engaged in the study of (1) Sedimentology and/or Stratigraphy, and (2) Geomorphology and/or Climatology. We welcome candidates that combine these specialties in innovative ways, and are willing to consider joint applications. Successful candidates should demonstrate potential to be outstanding teachers, active scholars, and contributors to the continued growth of the Department and College. Candidates must have a Ph.D. at the time of appointment.

We seek colleagues who are committed to teaching excellence in the liberal arts tradition, are field-based, have broad interests beyond their individual specialties, and will provide a balance of classroom, field, and laboratory experiences for our students. Candidates must have the desire and ability to teach courses at all levels of the curriculum. The typical teaching load is three lab courses per year. In addition, successful candidates are expected to maintain vibrant and productive research programs that actively incorporate undergraduate students.

Denison University is a highly selective, private residential liberal arts college enrolling approximately 2100 undergraduate students from across the country and around the world. The college is located in the village of Granville, Ohio, 25 miles east of Columbus. For more information about Denison, visit our website at www.denison.edu.

All application materials will be handled electronically at https://employment.denison.edu. (Please clearly indicate the desired position.) Applications must include: (1) a letter of application addressing the position requirements listed above; (2) a current curriculum vita; (3) academic transcripts of undergraduate and graduate course work (unofficial acceptable); (4) a statement of teaching philosophy and experience; and, (5) a statement of your research program in a liberal arts context. In addition, please include the contact information for three persons who know your teaching and scholarship well, who will then be requested to upload reference letters. Completed application materials submitted by October 15, 2015 will receive full consideration, and evaluation will continue until the position is filled. For those attending, we plan to meet with selected candidates at the 2015 GSA Annual Meeting in Baltimore, Maryland.

To achieve our mission as a liberal arts college, we continually strive to foster a diverse campus community, which recognizes the value of all persons regardless of religion, race, ethnicity, gender, sexual orientation, disability, or socioeconomic background. For additional information and resources about diversity at Denison please see our Diversity Guide at http://denison.edu/forms/diversity-guide. Denison University is an Affirmative Action, Equal Opportunity Employer.

GEOPHYSICS
DEPARTMENT OF EARTH SCIENCE
UC SANTA BARBARA

The Dept. of Earth Science at the University of California, Santa Barbara, invites applications for a tenure-track Assistant Professor position in Geophysics, starting July 1, 2016. We seek an innovative geophysicist who investigates solid Earth processes with modern geophysical data and/or simulation methods. All areas of technical expertise will be considered, with preference for seismology, geodesy, and/or numerical modeling. We seek candidates who complement our current research program and integrate tectonics and geophysics.

The successful candidate is expected to develop a vigorous, externally funded research program and to advise graduate and undergraduate students. A Ph.D. or an equivalent degree is required at the time of appointment.

Applicants should submit a PDF containing a letter of application, their curriculum vitae, a description of teaching and research objectives and accomplishments, and the contact information of three referees who will provide letters. Applicants should request that the three referees send letters of evaluation by October 1st, 2015. The application file and letters of reference should be submitted to https://recruit.ap.ucsb.edu.

Review of applications will begin October 1st, 2015. The position will remain open until filled, but to ensure full consideration, application materials should be submitted by this date.

The department is especially interested in candidates who contribute to the diversity and excellence of the academic community through research, teaching, and service.

The University of California is an Equal Opportunity/Affirmative Action employer and all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, sexual orientation, gender identity, national origin, disability status, protected veteran status, or any other characteristic protected by law.

PHYSICAL HYDROGEOLOGIST, GEOLOGY
WEST VIRGINIA UNIVERSITY

West Virginia University Dept. of Geology & Geography invites applications for a tenure-track position in geology at the Assistant Professor level. This position, related to the stewardship of freshwater resources, is one of several university-wide, research-focused initiatives (http://research.wvu.edu/about). Research on freshwater is an area of growth across campus and includes a new interdisciplinary Water Center.

Applicants are expected to hold a Ph.D. or equivalent degree in Geology or related field at the time of appointment. We seek applications from individuals with interests in basic and applied aspects of groundwater flow in the critical zone and/or deeper regimes. The successful applicant will possess demonstrable expertise in study of subsurface water flow and/or transport processes that may be applied to competitively-funded research problems. Specialties may include, but are not limited to, flow modeling in porous media; hyporheic or vadose zone processes; groundwater-surface water interaction; flow in fractured media; hydrogeology of energy-related activities; water supply and sustainability; contaminant and solute transport; and/or karst hydrogeology. The position will begin in January or August 2016.

Candidates will be evaluated on the basis of their potential to establish a vigorous externally-funded research program, publish scholarly work, mentor graduate students, and to teach at the undergraduate

STEPHEN F. AUSTIN
STATE UNIVERSITY

NACOGDOCHES, TEXAS

ASSISTANT PROFESSOR
DEPARTMENT OF GEOLOGY

The Stephen F. Austin State University Department of Geology is accepting applications for a tenure-track position at the assistant (or associate) professor level in one or more of the following specialties: geochemistry, petrology, sedimentology or environmental geology. Applicants should have a doctoral degree in geology, a strong commitment to excellence in teaching and willingness to direct Master of Science geology graduate students in research. Additionally, applicants should have a strong interest in and aptitude for teaching summer field camp. Teaching responsibilities include introductory courses, upper-level and graduate courses in the applicant's specialty, and occasional weekend field trip courses. Other expectations include research, university service and continuing professional development.

Submit a letter of application, CV and contact information for three references to https://careers.sfasu.edu (posting 0603713).

Also, mail official transcripts to:
Dr. Wesley Brown, Search Committee Chair
Stephen F. Austin State University
Department of Geology
P.O. Box 13011, SFA Station
Nacogdoches, TX 75962-3011
(936) 468-3701

Review of applications will begin Oct. 15 and continue until the position is filled. SFA is an equal opportunity employer. This is a security-sensitive position and will be subject to a criminal history check.

and graduate levels. Qualified applicants should submit the following items to hydrogeo@mail.wvu.edu: (1) a single PDF file including a statement of research interests, a statement of teaching philosophy, and curriculum vitae; and (2) pdf files of up to 4 publications. Please also arrange for three letters of reference to be sent to the same email address.

Review of applications will commence on September 15, 2015 and continue until a successful candidate is identified. For additional information, please see http://pages.geo.wvu.edu/hydrogeo or contact the search chair Dorothy J. Vesper at djvesper@mail.wvu.edu. WVU is an EEO/Affirmative Action Employer and welcomes applications from all qualified individuals, including minorities, females, individuals with disabilities, and veterans.

Fellowship Opportunities

WIESS POST-DOCTORAL RESEARCH FELLOWSHIP
DEPARTMENT OF EARTH SCIENCE
RICE UNIVERSITY

The Dept. of Earth Science at Rice University is launching a Wiess Post-Doctoral Research Fellowship competition in the broad fields of Earth, atmospheric, and planetary sciences. Interested candidates should have recently completed their Ph.D. or are expected to complete their Ph.D. by September 2016. The appointment of the fellow is expected to begin anytime between July and December 2016.

The principal selection criteria for the fellow are scientific excellence and a clearly expressed research plan to address questions at the forefront of Earth science, broadly defined. Applicants are expected to propose their own research ideas, but are encouraged to consider the current spectrum of research activities in the department and to communicate with one or more members of the faculty (http://earthscience.rice.edu/).

The research fellowship will be supported by the Dept. of Earth Science for two years pending satisfactory progress in their first year. The fellowship covers an annual stipend of $60,000 and includes an annual research allowance of $3,500.

Candidates are required to submit:

(1) A cover letter addressed to the search committee chair
(2) A research proposal of no more than 3 single-spaced pages excluding references
(3) A current CV
(4) A list of publications
(5) A list of four referees with full contact details

All documents should be submitted as a single .pdf file to the chair of the fellowship search committee (esci-postdoc@rice.edu). The application deadline is November 1, 2015. The highest ranked candidates will be invited to visit Rice in early 2016, and the decision of the award will be announced March 1, 2016.

Equal Opportunity Employer—Females/Minorities/Veterans/Disabled/Sexual Orientation/Gender Identity.

Opportunity for Students

A Ph.D. Fellowship is available in the Department of Geosciences at Georgia State University. The fellowship will lead to the degree of Ph.D. in Chemistry (Geology Specialization), although all coursework and research activities will be in Geosciences (geosciences.gsu.edu). The work will focus on studying the energetics of fundamental chemical reactions at metal-oxides-solution interfaces. The lab has focused particularly on experimental thermodynamics through the utilization and development of flow adsorption microcalorimetry techniques and instrumentation although other relevant techniques will be equally utilized. Requirements include an M.S. degree in Geosciences or related field (inorganic or analytical chemistry, soil physical chemistry, chemical engineering, etc.) some experience or strong desire to learn geochemistry, and acceptance into the Ph.D. program. Students interested in a Ph.D. in Chemistry (no Geology Specialization) can elect to go through the Chemistry department (chemistry.gsu.edu) although some coursework requirements may change. The stipend is $25,000 per year. The preferred start date is January 2016. Georgia State University is a growing research university in the dynamic heart of downtown Atlanta. For more information please contact Nadine Kabengi at Kabengi@gsu.edu or +1-404-413-5207.

Fourth International EarthCache Event

The Fourth International EarthCache Event (4IEE) will take place on the 19 Sept. 2015 in Goslar, Germany. This event will bring around 1,000 or more EarthCachers from around the globe to meet, discuss, and learn about EarthCaching. EarthCaching is a program coordinated by GSA in partnership with Geocaching.com as part of the international GPOS-driven adventure game of geocaching. An EarthCache is a type of geocache that is visited by the general public. At the site, they learn about geology and undertake an educational task. There are currently more than 20,000 EarthCache sites around the planet, and these have been visited by more than six million people.

You can find out more information about 4IEE at **www.4IEE.com** and about EarthCaching at **www.earthcache.org.**

EarthCaching is just one of the many programs run by the GSA Education & Outreach team.

Let the Earth be Your Teacher!

THE GEOLOGICAL SOCIETY OF AMERICA®

Annual Meeting & Exposition

25-28 SEPTEMBER

GSA 2016

Denver, Colorado, USA

Field Trip Proposals Deadline: **1 December 2015**

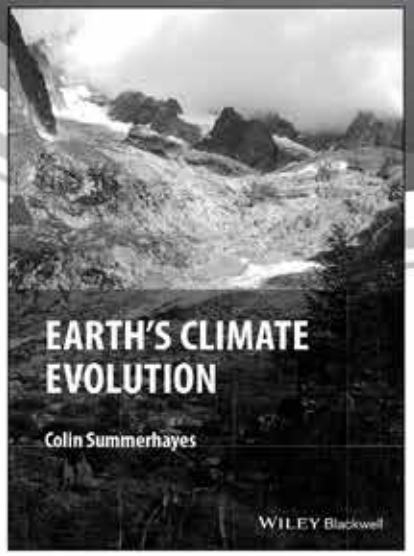
Technical Session & Short Course Proposal Deadline: **1 February 2016**

Abstracts Submission Deadline: **12 July 2016**

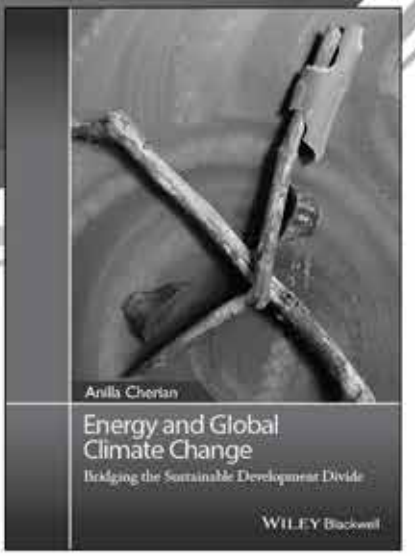
Share Your Science, Network, and Explore Colorado

www.geosociety.org/meetings/2016

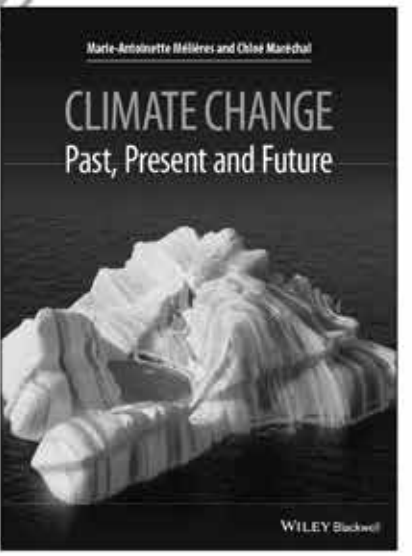
New from Wiley's Earth & Environmental Science Book Program



Earth's Climate Evolution

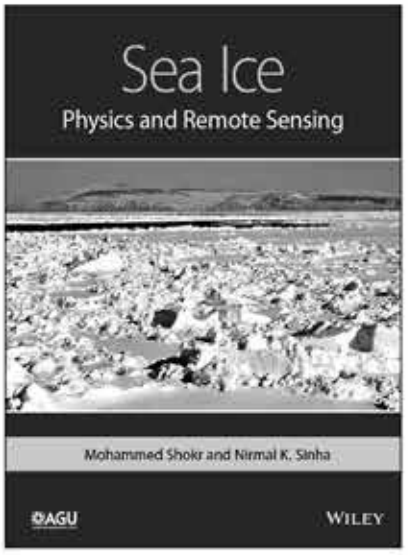


Climate Change and Energy

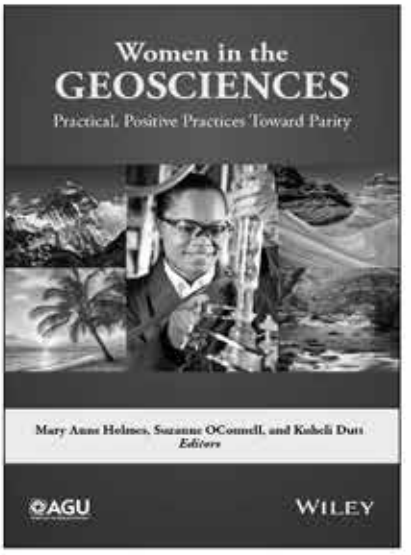


Climate Change: Past, Present, and Future

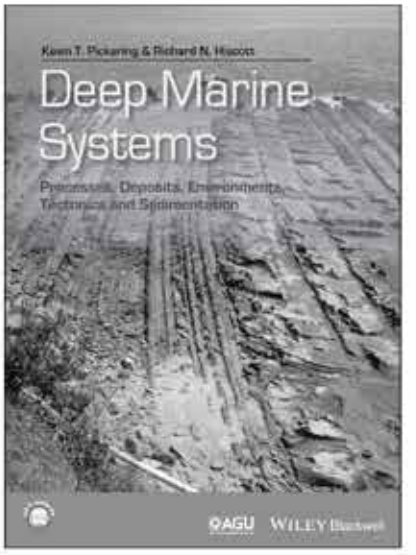
Co-published with AGU



Sea Ice: Physics and Remote Sensing



Women in the Geosciences: Practical, Positive Practices Toward Parity



Deep Marine Systems: Processes, Deposits, Environments, Tectonic and Sedimentation

GROUNDWORK
Furthering the Influence of Earth Science

The Snowmastodon Project: Cutting-edge science on the blade of a bulldozer

Jeffrey S. Pigati, *U.S. Geological Survey, Denver Federal Center, Box 25046, MS-980, Denver, Colorado 80225, USA, jpigati@usgs.gov;* ***Ian M. Miller,*** *Dept. of Earth Sciences, Denver Museum of Nature & Science, 2001 Colorado Blvd., Denver, Colorado 80205, USA; and* ***Kirk R. Johnson****, Dept. of Earth Sciences, Denver Museum of Nature & Science, 2001 Colorado Blvd., Denver, Colorado 80205, USA*

FIRST A DISCOVERY, THEN DIGGING LIKE MAD

Scalpel. Knife. Shovel. A bulldozer's blade.

Cutting-edge science happens at a variety of scales, from the individual and intimate to the large-scale and collaborative. The publication of a special issue of *Quaternary Research* in Nov. 2014 dedicated to the scientific findings of the "Snowmastodon Project" highlights what can be done when natural history museums, governmental agencies, and academic institutions work toward a common goal.

On 14 Oct. 2010, a third-generation bulldozer driver named Jesse Steele was pushing dirt as part of a reservoir expansion project high in the Rocky Mountains at Ziegler Reservoir, just outside Snowmass Village, Colorado, USA. The reservoir was to be enlarged to meet the needs of a growing population and a local ski resort, and up until that point, the work was right on schedule. When Steele pushed up some strange bones along with the usual lake muds, however, it was apparent that everything was about to change.

The new owners of the site, the Snowmass Water and Sanitation District (SWSD) placed phone calls, first to the Colorado State Geological Survey and then to the Denver Museum of Nature & Science (DMNS). Within a day of the discovery, the DMNS had mobilized a group of scientists, including several geologists from the U.S. Geological Survey (USGS), to visit the site and determine if the find was an isolated occurrence or perhaps the beginning of something larger. As it turned out, the term "large" wasn't quite right. Huge, perhaps? Enormous? Epic? Maybe all of the above?

During a span of three weeks in the fall of 2010 and seven weeks in the spring of 2011, dozens of scientists from around the world joined more than 250 volunteers to recover a treasure-trove of late Pleistocene fossils that included American mastodon, Columbian mammoth, and other large megafauna and to study the site and its history. The excavations were conducted initially using a technique called "bladerunning," during which a scientist would walk alongside the blade of a bulldozer and ask the driver to a halt whenever evidence of a fossil popped up. When that happened, the bulldozer would move over a bit, the site would be flagged, and a team of volunteers would race over, dig like mad, and document the position and orientation of the fossil before removing it for transport offsite. The driver would then work in a different area with the bladerunner in tow until the site was cleared.

Figure 1. An army of scientists and volunteers removed ~8,000 cubic meters of sediment (all by hand!) from the Ziegler Reservoir fossil site near Snowmass Village, Colorado, USA, and recovered thousands of Pleistocene fossils.

This delicate dance between construction and science proceeded amidst a climate of growing trust. On one hand, it was

GSA Today, v. 25, no. 9, doi: 10.1130/GSATG240GW.1.

*Current address: National Museum of Natural History, Smithsonian Institution, Box 37012, MRC 106, Washington, D.C. 20013, USA.

obvious to everyone that what was being uncovered at the site was truly remarkable and perhaps unprecedented. On the other hand, the construction crew had a very real deadline to meet. The question on everyone's mind was, "Can we really pull this off in time?"

After the furious schedule of the salvage operation in 2010, it was clear that site was vast and important. The bladerunning technique had to be abandoned in 2011 because there were simply too many fossils. An army of highly trained volunteers was brought in with the task of excavating dirt, rocks, and bones for eight hours a day, six days a week. The clank of metal shovels echoed through the subalpine forest day after day amidst project co-leader Kirk Johnson's imploring calls to "dig faster!" and an occasional cry of "bring me the head of Ziggy the sloth!" During the 2011 field season alone, the crew removed roughly 8,000 cubic meters of sediment, all by hand, and recovered more than 5,000 large bones and tens of thousands of smaller ones. On average, a large bone was pulled out of the ground about every five minutes for the entirety of the dig. The work was hard, no doubt, but the allure of discovery was a powerful force!

NEXT, A WOBBLE, AND THEN THE FINISH LINE

Each night, after meals prepared by yet another group of volunteers, the team would get together for a daily round of show-and-tell. It was a fun and light-hearted way to recount the day's finds, as well as to encourage and challenge each other as the days grew longer. One particular night, toward the end of the 2011 season, a visitor questioned the team about the long-term plans for the site. Until then, with so much work to be done before the impending deadline, little energy was directed at anything but moving the next pile of dirt. With the crowd perking up a bit, and the transfer of thought moving from the present to the future, he suggested that the site was of such scientific importance that the team should reconsider their agreement with SWSD and push for some sort of effort to preserve the site as an open-pit paleontological site where visitors could view the specimens laid out as they were discovered.

Intense debate, alternatives, and opinions were thrown about late into the night. The enlarged lake basin, which by then was nearly ten meters deep, was supposed to be filled with water in just a few short months. What lay before us was a pretty simple, but terrifying, conundrum: "Do we want a palace (park/museum) or a puddle (reservoir)?" Arguments went back and forth, with the idea of preserving the site gaining traction.

At that point, an observation was made. The site was incredible to be sure. And the preservation of the fossil material—including intact conifer cones and sedge leaves that remained green after nearly 100,000 years of burial, not to mention tusks that were so pristine that they reflected the image of the person holding them—were things that none of us had ever seen. But what was it about the site that allowed for such preservation over such a long period of time? Was it an open pit in the past? Obviously not—it was a lake. If we really wanted fossils that remained in the lake sediments to be preserved for future generations, what better way to do this than to return the site to its original condition? After still more debate, a final decision was made: We would return the site to its original condition and landowner intent, that is, a lake. Knowing they could make good on their promises, Kirk Johnson and project co-leader Ian Miller breathed sighs of relief and got back to work.

Remarkably, the SWSD had also been thinking about the long-term plans for the site as they neared completion of the dam. On their own initiative, the SWSD built a gravel road that extended down to the bottom of the lake basin. Their idea was that some time in the future, during summer months in years where the demand for water was low, the lake could be drained and a new round of excavations could take place. Thus, the delicate dance between science and construction had come full circle—from the uneasy wariness of the first few days after the initial discovery, to full cooperation and promises kept—and work at the site was complete.

AND FINALLY, ON TO THE FUTURE

Using a combination of dating techniques ranging from radiocarbon and cosmogenic surface-exposure dating to uranium series and optically stimulated luminescence, scientists ultimately determined that lake sediments at the site spanned 85,000 years, from ~140,000 to 55,000 years before present, including the end of Marine Oxygen Isotope Stage (MIS) 6, all of MIS 5 and MIS 4, and the earliest part of MIS 3. Importantly, the site provides the first opportunity to study ecosystem response to climate change during the Last Interglacial Period (MIS 5) at high elevation (~2705 m above sea level) in the Colorado Rockies.

Thus far, scientists have used a variety of environmental proxies, including pollen, plant macrofossils, tree rings, macro- and micro-vertebrates, and macro- and micro-invertebrates, as well as close examination of the stratigraphy, particle size distribution, and geochemistry of the lake sediments, to reconstruct changes in environmental conditions at the site over time. However, there are still tremendous opportunities for future work for those interested in studying aspects of the site that were not covered by the original studies. Vertebrate fossils are housed at the DMNS; pollen, plant macrofossils, and invertebrates (insects, chironomids, mollusks, and ostracodes) are stored at various academic institutions; and sediment cores that span the entire lake sequence are available for study through the USGS. It is our hope that the collaborative spirit of the Snowmastodon Project will inspire scientific studies for generations to come.

REFERENCE CITED

Pigati, J., and Miller, I., eds., 2014, The Snowmastadon Project: Quaternary Research, v. 82, no. 3, p. 473–634.

Manuscript received 28 Dec. 2014; accepted 9 Feb. 2015.

John W. (Jack) Hess, *GSA Foundation President*

Pardee Coterie

As many GSA members are aware, bequest gifts from the estates of R.A.F. Penrose Jr. and Joseph Thomas Pardee have had historic and transformative impacts on GSA's ability to carry out its mission of science, stewardship, and service. Fortunately, the story about support from legacy gifts remains a current one.

Since its founding in 1980, the GSA Foundation has received estate gifts totaling more than US$7.2 million. Each gift represents an extension of trust to the Foundation and the Society to wisely use these gifts to advance the geosciences. These commitments help GSA to deliver, in perpetuity, a robust scope of opportunities, services, and support for core GSA priorities, such as research, professional development, and public awareness of the role of geoscience in our society.

The Pardee Coterie includes individuals who have informed the Foundation of their charitable plans to include support for GSA. The Coterie honors Joseph T. Pardee, a 32-year (1909–1941) employee of the U.S. Geological Survey, whose legacy reflects the example of GSA members who are dedicated scientists and generous supporters of their community.

If you have included the GSA Foundation in your estate plans, we would be honored to add you to the ranks of the Pardee Coterie. The Pardee Coterie includes 57 individuals—We are confident there can be many more, and we would enjoy hearing from you!

The GSA Foundation appreciates gifts and commitments in all amounts. Your generosity helps GSA advance geoscience discovery and provide formative opportunities for students and professionals.

Thank you for your support of GSA through the GSA Foundation!

For all inquiries regarding gifts, funds, and gift planning, please contact Chris Tallackson, GSA Foundation Director of Development, +1-303-357-1007, ctallackson@geosociety.org. Visit the GSA Foundation website for additional information about ways to give at **www.gsafweb.org/donate.**

www.gsafweb.org

There are many ways to include the GSA Foundation in your estate plans, including the following:

♦

Name the GSA Foundation in your will or trust;

♦

Designate the GSA Foundation as a beneficiary of a retirement plan or life insurance policy; and

♦

Transfer stocks and securities to the GSA Foundation.

♦

Please consult with your financial advisor, accountant, or attorney for guidance regarding all charitable giving decisions.

New Impact Factors Announced

Geology Still #1

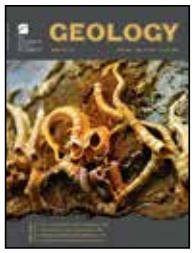
Geology has continued its reign as the Journal Citation Reports' #1 ranked geology journal for the ninth year in a row. This year, the journal's impact factor rose to 4.884, and its five-year impact factor rose to 4.962.

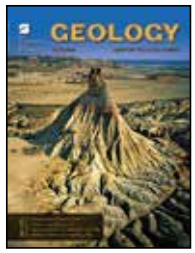
The Geological Society of America Bulletin's impact factor dipped slightly to 3.870, with a five-year impact factor of 4.634. It is the #12 ranked multidisciplinary geosciences journal.

After increasing 24% last year, *Lithosphere*'s impact factor rose again to 3.013. Its five-year impact factor is 2.743.

Geosphere had an impact factor of 2.012, with a five-year impact factor of 2.652.

While Thomson Reuters does not produce impact factors for book series, it indexes GSA's Special Papers, Memoirs, and Reviews in Engineering Geology in its Book Citation Index, which is part of the Web of Science.





Browse GSA's journals & books at www.gsapubs.org

GSA Publications Highlights

THE GEOLOGICAL SOCIETY OF AMERICA®

2016 GSA Section Meetings

THE GEOLOGICAL SOCIETY OF AMERICA®

SOUTH-CENTRAL
21–22 March
Hilton Baton Rouge Capitol Center,
Baton Rouge, Louisiana, USA
Chair:
Peter Clift, pclift@lsu.edu

▼

NORTHEASTERN
21–23 March
Albany Convention Center,
Albany, New York, USA
Co-chairs:
Helen Mango, helen.mango@castleton.edu;
Tim Grover, tim.grover@castleton.edu

▼

SOUTHEASTERN
31 March–1 April
Columbia Metropolitan Convention Center,
Columbia, South Carolina, USA
Chair:
Venkat Lakshmi, vlakshmi@geol.sc.edu

▼

CORDILLERAN
4–6 April
Ontario Convention Center,
Ontario, California, USA
Chair:
Jade Star Lackey, jadestar.lackey@pomona.edu

▼

NORTH-CENTRAL
18–19 April
I-Hotel and Conference Center,
Champaign, Illinois, USA
Chair:
Steve Brown, steebrow@illinois.edu

▼

ROCKY MOUNTAIN
18–19 May
University of Idaho,
Moscow, Idaho, USA
Co-chairs:
Brian Yanites, byanites@uidaho.edu;
Leslie Baker, lbaker@uidaho.edu

TEXAS Geosciences

The University of Texas at Austin
Jackson School of Geosciences

Developing Leaders in the Geosciences

Seeking the world's best graduate students, postdocs, research scientists and faculty

#8 graduate program in Earth Sciences, *U.S. News*

$90 million in annual funding

400 research locations worldwide

Congratulations to the
GeoFORCE Program

Winner of the *Presidential Award for Excellence in Science, Mathematics and Engineering Mentoring*, the highest such honor from the United States government.

jsg.utexas.edu · Facebook.com/UTJSG · @txgeosciences · YouTube.com/jsgutaustin

THE UNIVERSITY OF TEXAS AT AUSTIN
JACKSON
SCHOOL OF GEOSCIENCES