

# GSA Annual Meeting & Exposition

## The Pursuit of Science



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 THE GEOLOGICAL SOCIETY  
OF AMERICA

3300 Penrose Place  
P.O. Box 9140  
Boulder, Colorado  
80301-9140, USA

Tel +1.303.357.1000  
Fax +1.303.357.1070

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Many of North America's first geologists traveled to Philadelphia to share recent discoveries with other earth scientists at the University of Pennsylvania, the American Philosophical Society, and the Academy of Natural Sciences. Our 2006 Annual Meeting will carry on that tradition with a diverse array of symposia, field trips, and short courses.

The scientific exchanges and personal interactions that occur in the topic and discipline sessions represent the center of all GSA Annual Meetings. This year, Robert Young and his colleagues have organized over 230 sessions. These sessions cover a range of intriguing topics, including paleoenvironmental reconstructions, the toxicity of drinking water, and montane tropical streams. In addition, Pardee Keynote Symposia and *Hot Topics* sessions will cover a range of emerging subjects, including the interactions of earth and health scientists, links between geologic and microbial processes, and geosciences and the media.

It wouldn't be a GSA Annual Meeting without rock outcrops and field trips. This year Frank Pazzaglia and his colleagues have compiled an extraordinary set of field trips that includes trips to classic Appalachian outcrops, visits to the K-T boundary, and the history and geology of Gettysburg. The meeting also features over a dozen short courses, including a special K-12 teacher field trip and workshop.

Numerous historical sites and museums can easily be visited on short trips within Philadelphia. In addition, GSA staff presents programs for guests and families that include picnics, historical tours, and visits to the beautiful Amish countryside.

We look forward to welcoming many thousands of you to the City of Brotherly (and Sisterly) Love to engage in the continuing study of our dynamic science.

Robert Giegengack and Frederick N. Scatena  
*2006 Annual Meeting General Co-Chairs*

## *Building on a Foundation of Discovery*

### *22-25 October 2006, Philadelphia, Pennsylvania*

#### Local Committee

GENERAL CO-CHAIRS

**Robert Giegengack**

University of Pennsylvania  
[gieg@sas.upenn.edu](mailto:gieg@sas.upenn.edu)

**Frederick N. Scatena**

University of Pennsylvania  
[fns@sas.upenn.edu](mailto:fns@sas.upenn.edu)

TECHNICAL PROGRAM CHAIR

**Robert Young**

Western Carolina University  
[ryoung@email.wcu.edu](mailto:ryoung@email.wcu.edu)

FIELD TRIP CHAIR

**Frank J. Pazzaglia**

Lehigh University  
[fjp2@lehigh.edu](mailto:fjp2@lehigh.edu)

HOT TOPICS CHAIR

**Bruce F. Molnia**

U.S. Geological Survey  
[bmolnia@usgs.gov](mailto:bmolnia@usgs.gov)

K-12 CHAIR

**Michael Passow**

Lamont-Doherty Earth Observatory  
[michael@earth2class.org](mailto:michael@earth2class.org)



# ➤ 2006 Exhibitors ◀

Exhibitors are listed by category as registered by press copy deadline. See up-to-the-minute listings of exhibitors at [www.geosociety.org/meetings/2006/xibits.htm](http://www.geosociety.org/meetings/2006/xibits.htm).

## Computer Software

ESRI  
GEON  
iGage Mapping  
RockWare Inc.

## Gems/Minerals Dealers, Jewelry/Gifts

Designs On You  
Gems & Crystals Unlimited  
Howard Minerals  
IKON Mining & Cal Graeber  
Komodo Dragon  
Nature's Own  
R&R PaleoArt

## General Educational Products

Geosoft Inc.  
IRIS Consortium  
Ward's Natural Science Est. LLC

## Geographic Supplies and Related Equipment

Armfield  
Forestry Suppliers Inc.  
Rite in the Rain

## Geological and Geophysical Instrumentation

Advanced Geosciences Inc.  
ASC Scientific  
Bruker AXS  
Cameca Instruments Inc.  
Campbell Scientific Inc.  
CETAC Technologies  
DeltaNu LLC  
EmCal Scientific Inc.  
Gatan Inc.  
Geophysical Survey Systems Inc.  
GV Instruments Inc.  
HORIBA Jobin Yvon Inc.  
Leica Microsystems Inc.  
Marks Products Inc.  
Meiji Techno America  
New Wave Research  
Ocean Optics  
Panalytical  
Rigaku  
Sensors & Software Inc.  
Soilmoisture Equipment Corp.  
Thermo Electron

## Government Agencies (Federal, State, Local, International)

Geoscience Laboratories  
Los Alamos National Laboratory  
NASA—Earth System Science  
National Park Service  
National Science Foundation  
Oklahoma Geological Survey  
U.S. Bureau of Land Management  
U.S. Geological Survey  
USDA Forest Service

## Other

Earth Science-Cyberinfrastructure  
(ES-CI) Forum  
EarthChem  
EarthScope  
EDAX Inc./TSL  
Environmental Careers Organization  
Gemological Institute of America  
GSA Archaeological Geology Division  
GSA Bookstore  
GSA Foundation  
GSA Geoinformatics Division  
GSA Geology and Health Division  
GSA Headquarter Services  
GSA Member Services  
GSA Planetary Geology Division  
Instrumentation Northwest Inc.  
Joint Oceanographic Institutions  
National Research Council  
**Subaru of America Inc.\***  
UNAVCO

## Professional Societies and Associations

American Association of Petroleum Geologists  
American Association of Stratigraphic  
Palynologists  
American Geological Institute  
American Geophysical Union  
American Institute of Professional Geologists  
American Meteorological Society  
American Quaternary Association  
Assoc. of Environmental & Engineering  
Geologists  
Association for Women Geoscientists  
Association of American State Geologists  
Association of Earth Science Editors  
Council on Undergraduate Research,  
Geosciences Division  
Cushman Foundation  
Ecological Society of America  
Geochemical Society  
Geological Association of Canada  
Geological Society of Australia  
Geoscience Information Society  
GeoScienceWorld  
GSA History of Geology Division  
History of Earth Sciences Society (HESS)  
International Association of GeoChemistry  
International Year of Planet Earth  
Mineralogical Association of Canada  
Mineralogical Society of America  
National Association of Geoscience Teachers  
National Association of State Boards of Geology  
National Cave & Karst Research Institute  
National Earth Science Teachers Assoc.  
The Paleobiology Database  
The Paleontological Society  
Pittsburgh Geological Society  
Sigma Gamma Epsilon

Society for Advancement of Chicanos and  
Native Americans in Science (SACNAS)  
Society for Sedimentary Geology  
Society of Economic Geologists  
Southern California Earthquake Center

## Publications, Maps, Films

Allen Press Inc.  
Blackwell Publishing  
Brooks/Cole, Thomson  
Cambridge University Press  
CSA  
Elsevier  
Historic Urban Plans Inc.  
Kendall/Hunt Publishing  
McGraw-Hill Higher Education  
Micro Press  
Mountain Press  
NRC Research Press  
Paleontological Research Institution  
Prentice-Hall  
Radiocarbon  
Springer  
University of Chicago Press  
W.W. Norton & Company  
W.H. Freeman & Company  
Wiley

## Services (Exploration, Laboratories, Consulting, and others)

Activation Laboratories Ltd.  
Beta Analytic Inc.  
Bucks Geophysical Corporation  
DOSECC  
Environmental Isotope Lab  
In-Situ Inc.  
Kerr-McGee  
SPEX SamplePrep LLC

## State Surveys

Pennsylvania Geological Survey—Dept. of  
Conservation and Natural Resources

## Universities/Schools

Baylor University, Dept. of Geology  
Boston College, Dept. of Geology and  
Geophysics  
Desert Research Institute  
Louisiana State University, Dept. of  
Geology & Geophysics  
Mississippi State University  
PALEOSTRAT  
University of Delaware, Geology Dept.  
University of Nevada—Las Vegas  
University of Nevada—Reno  
University of South Carolina  
University of Texas at Austin, Jackson  
School of Geosciences

## \*Title Sponsor

## EXHIBITS OPENING & WELCOMING PARTY

Sun., 22 Oct. .... 5:30–7:30 p.m.

## EXHIBIT HALL HOURS

Mon.–Tues., 23–24 Oct. .... 9 a.m.–5:30 p.m.  
Wed., 25 Oct. .... 9 a.m.–2 p.m.

## ➤ Pardee Keynote Symposia ◀

The Pardee Keynote Symposia are made possible by a grant from the Joseph T. Pardee Memorial Fund.

These Pardee Keynote sessions are *special events* of broad interest to the geoscience community. They represent hot issues on the leading edge in a scientific discipline or area of public policy, address broad fundamental issues, and are

interdisciplinary. Selection was on a competitive basis. This year's eight Pardee Symposia were reviewed and accepted by the Annual Program Committee.

**P6. Natural and Anthropogenic Disasters: Earth and Health Scientists Working Together to Identify Potential Health Issues and Improve Outcomes**

*GSA Geology and Health Division*  
Sun., 22 Oct., 8 a.m.–noon

**P4. Holocene Sea Level Change in North America: A Post-Katrina Assessment**

*GSA Quaternary Geology and Geomorphology Division; IGCP 495 (Quaternary Land-Ocean Interactions: Driving Mechanisms and Coastal Responses)*  
Sun., 22 Oct., 1:30–5:30 p.m.

**P8. When One Planet Isn't Enough: Celebrating 25 Years of Solar System Exploration**

*GSA Planetary Geology Division*  
Sun., 22 Oct., 1:30–5:30 p.m.

**P1. Erosion: Processes, Rates, and New Measuring Techniques**

*GSA Quaternary Geology and Geomorphology Division*  
Mon., 23 Oct., 8 a.m.–noon

**P3. Geosciences and the Media: How Can We Better Communicate the Imperatives of Sustainability?**

*GSA Geology and Society Division; Critical Issues Caucus, Geology and Public Policy Committee; GSA Quaternary Geology and Geomorphology Division; GSA Engineering Geology Division; Association of Earth Science Editors*  
Mon., 23 Oct., 1:30–5:30 p.m.

**P2. Evidence for Long-Term Survival of Microorganisms and Preservation of DNA**

*GSA Geobiology and Geomicrobiology Division*  
Tues., 24 Oct., 8 a.m.–noon

**P5. Links between Geological Processes, Microbial Activities, and Evolution of Life**

*GSA International Division; GSA Geobiology and Geomicrobiology Division; GSA Geology and Society Division; GSA Structural Geology and Tectonics Division*  
Tues., 24 Oct., 1:30–5:30 p.m.

**P7. Using Historical Photographs and Maps to Document Landscape Evolution and the Impacts of Changing Climate: A Celebration of the 96th Birthday of Bradford Washburn**

Wed., 25 Oct., 8 a.m.–noon

## ➤ Speaker Ready Room Hours ◀



Pennsylvania Convention Center. Photo by Jim McWilliams, courtesy of the Philadelphia Convention and Visitors Bureau.

### Pennsylvania Convention Center Room 202AB

Fri., 20 Oct., 3–6 p.m.

Sat., 21 Oct., 7 a.m.–8 p.m.

Sun., 22 Oct., 6 a.m.–6 p.m.

Mon.–Tues., 23–24 Oct., 6:30 a.m.–6 p.m.

Wed., 25 Oct., 6:30 a.m.–3 p.m.

The Speaker Ready Room will be open Fri.–Wed., 20–25 Oct., to accommodate speakers submitting PowerPoint presentations. All presentations will be downloaded to a main file server and then uploaded to the specific computer in the technical session room in which the speaker will be making his or her presentation. Each speaker will advance his or her own presentation from the podium.

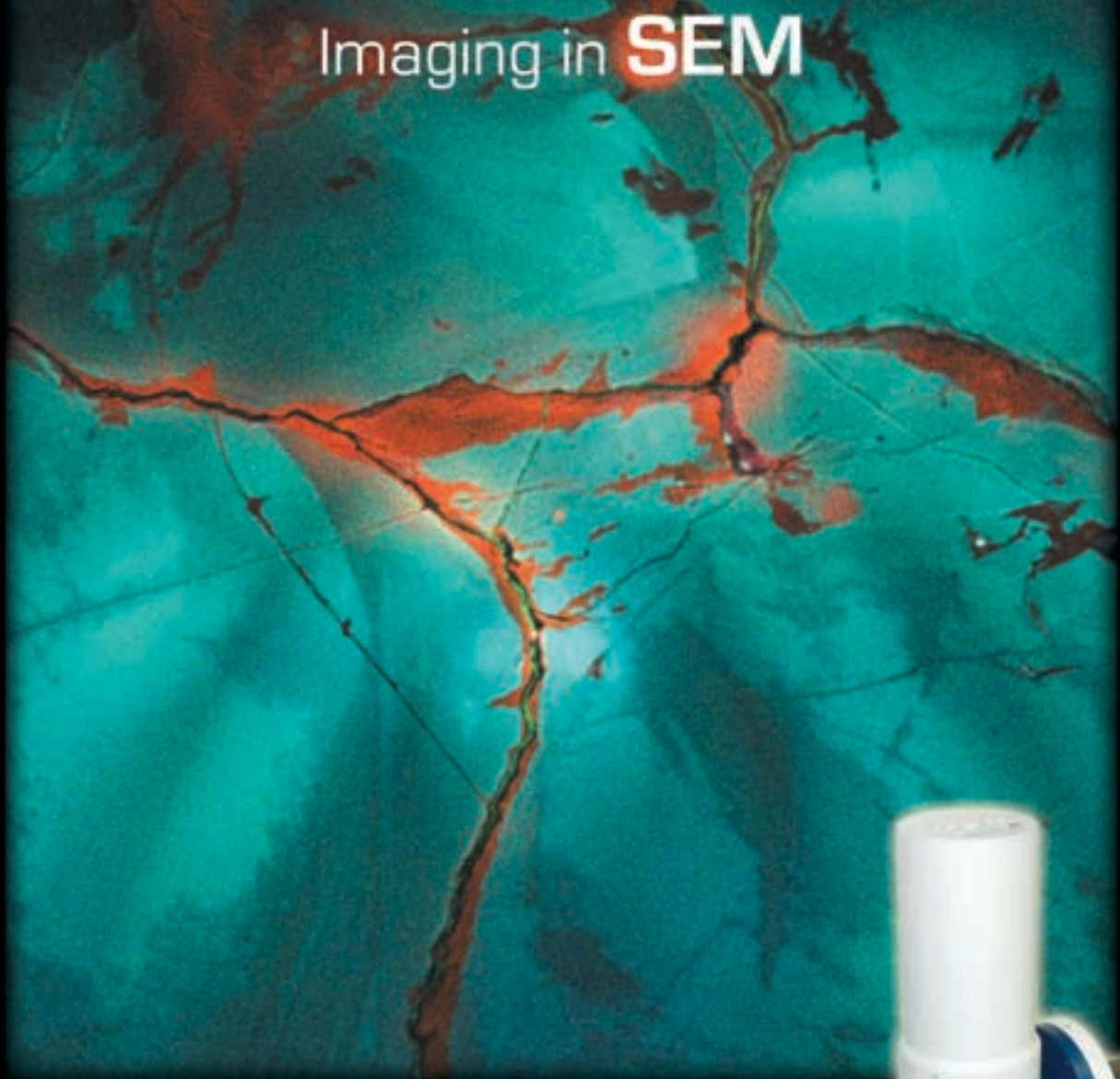
Speakers may submit their PowerPoint presentations on any format (CD-ROM, floppy disk, zip disk, thumb drive, compact flash card, SD card, multi-media card, or memory stick).

All PowerPoint presentations **MUST** be submitted to AVHQ (GSA's official audio-visual contractor) either in advance of the meeting via AVHQ's Web site, [www.avhqspeakerservices.com/srr/gsa](http://www.avhqspeakerservices.com/srr/gsa), **OR** on-site in the Speaker Ready Room. If you are a Sunday session speaker and are unable to get to the Speaker Ready Room the day or evening before your presentation, please come to the Speaker Ready Room first thing Sunday morning.

For presentation submission prior to meeting, please upload to the AVHQ Web site: [www.avhqspeakerservices.com/srr/gsa](http://www.avhqspeakerservices.com/srr/gsa)



# Live COLOUR CATHODOLUMINESCENCE Imaging in SEM



Colour cathodoluminescence (CL) image of a part of quartz grain in a granite sample. Late stage hydrothermal chemical alteration (red) is associated with cracks in the quartz (blue-green) caused by cooling of the granite mass. Width of image is approximately 1.4mm. Image acquired with Gatan's ChromaCL™ live colour CL system mounted on an FEI Quanta scanning electron microscope. Image courtesy of Prof. J. Schieber, Department of Geological Sciences, Indiana University, Bloomington, IN, USA.



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## ChromaCL

➔ 2006 Philadelphia Annual Meeting ⇐

The Pursuit of Science  
*Building on a Foundation of Discovery*

236 Technical Sessions

All sessions will be held at the Pennsylvania Convention Center and are oral unless indicated as poster sessions. Check the GSA Web site—[www.geosociety.org](http://www.geosociety.org)—for updates, detailed listings, abstracts, and the titles and authors database.

NO.	TIME	DESCRIPTION (SPONSORS)	LOCATION
<b>SUNDAY, 22 OCTOBER 2006</b>			
1	8 a.m.	Environmental Geoscience	113-C
2	8 a.m.	Hydrogeology: Fluids at Plate Boundaries and Aquifer System Analysis	103-C
3	8 a.m.	Structural Geology I	107-AB
4	8 a.m.	P6. Natural and Anthropogenic Disasters: Earth and Health Scientists Working Together to Identify Potential Health Issues and Improve Outcomes ( <i>GSA Geology and Health Division</i> )	Auditorium Lecture Hall
5	8 a.m.	T1. High Resolution Quaternary Records from Cave Environments ( <i>GSA Archaeological Geology Division; GSA Quaternary Geology and Geomorphology Division; GSA Hydrogeology Division; GSA Sedimentary Geology Division; Society for Vertebrate Paleontology; Paleontological Society; Geochemical Society; Karst Waters Institute</i> )	109-AB
6	8 a.m.	T12. Fractured Rock Characterization in Applied Geology ( <i>GSA Engineering Geology Division; GSA Structural Geology and Tectonics Division; American Rock Mechanics Association</i> )	111-AB
7	8 a.m.	T29. The Use of Molecular Techniques to Assess Microbial Community Structure and Function in Aquifer Systems ( <i>GSA Geobiology and Geomicrobiology Division; GSA Hydrogeology Division</i> )	112-B
8	8 a.m.	T39. Innovative Watershed-Based Approaches for Integrating Research and Education ( <i>GSA Geoscience Education Division; National Association of Geoscience Teachers</i> )	113-A

GSA 2006



GSA Presidential Address & Awards Ceremony

Pennsylvania Convention Center  
Auditorium Lecture Hall, Sat., 21 Oct., 7–9 p.m.

You're invited to attend the presidential address on Saturday evening. GSA President Stephen G. Wells will speak on *The Landscapes of the Geosciences*. Following this address, the citations and responses for GSA's 2006 Penrose, Day, and Donath medals, the American Geological Institute (AGI) Medal in Memory of Ian Campbell, and GSA's Public Service and Distinguished Service awards will be presented. GSA's newly elected Fellows and Honorary Fellows, recipients of Division named awards, and the Subaru Outstanding Woman in Science awardee will also be announced.

A reception will immediately follow the ceremony.

## Technical Sessions

NO.	TIME	DESCRIPTION (SPONSORS)	LOCATION
9	8 a.m.	T43. Addressing Present and Future Energy, Mineral, and Water Issues in the Classroom: The Need to Prepare Both Educated Citizens and Geoscientists ( <i>National Association of Geoscience Teachers; GSA Geoscience Education Division; GSA Geology and Society Division; Society of Economic Geologists</i> )	113-B
10	8 a.m.	T48. Geology in the National Parks: Research, Mapping, and Resource Management ( <i>National Park Service; GSA Geology and Society Division</i> )	110-AB
11	8 a.m.	T63. From the Scientific Revolution to the Enlightenment: Emergence of Modern Geology and Evolutionary Thought from the 16th–18th Century I ( <i>GSA History of Geology Division; Paleontological Society; History of the Earth Sciences Society</i> )	204-B
12	8 a.m.	T73. Nonpoint Source Pollution: Sources, Processes, Prediction, and Solutions ( <i>GSA Hydrogeology Division; GSA Geology and Society Division</i> )	104-A
13	8 a.m.	T76. Detecting and Characterizing Fluxes of Water and Dissolved Constituents across the Groundwater–Surface Water Interface I ( <i>GSA Hydrogeology Division; GSA Limnogeology Division</i> )	103-A
14	8 a.m.	T82. Reactions at Mineral–Water Interfaces: The Role of Solute Adsorption on Contaminant Co-Adsorption, Mineral Dissolution and Colloid Behavior ( <i>GSA Hydrogeology Division</i> )	103-B
15	8 a.m.	T100. Whet your Apatite: Advances in Research of Natural and Biological Apatite ( <i>Mineralogical Society of America</i> )	104-B
16	8 a.m.	T101. Petrologic Mineralogy—The Study of Minerals in Context I: In Honor of Charles V. Guidotti ( <i>Mineralogical Society of America</i> )	204-A
17	8 a.m.	T102. Atmosphere–Ice Sheet–Ocean Interactions: Modern Observations and Historical Interpretations	108-B
18	8 a.m.	T107. The EARTHTIME Project I ( <i>Paleontological Society</i> )	204-C
19	8 a.m.	T128. Sources, Transport, Storage, and Delivery of Sediment in the Chesapeake Bay Watershed ( <i>GSA Quaternary Geology and Geomorphology Division</i> )	108-A
20	8 a.m.	T139. Changes in Ocean and Atmospheric Redox State and the Evolution of Life I ( <i>Paleontological Society; GSA Geobiology and Geomicrobiology Division</i> )	105-AB
21	8 a.m.	T142. Terrestrial Impact Breccias ( <i>GSA Planetary Geology Division; GSA Sedimentary Geology Division</i> )	112-A
22	8 a.m.	Geomorphology (Posters)	Exhibit Hall C
23	8 a.m.	Paleontology/Paleobotany (Posters) I: Paleocology, Taphonomy, and Early Life	Exhibit Hall C
24	8 a.m.	Quaternary Geology (Posters)	Exhibit Hall C
25	8 a.m.	Sediments, Carbonates (Posters)	Exhibit Hall C
26	8 a.m.	T17. An Early Involvement of Undergraduates and K7–12 Students in Geological and Environmental Research (Posters) ( <i>GSA Geoscience Education Division</i> )	Exhibit Hall C
27	8 a.m.	T50. Effective Online Strategies for Teaching Geoscience at a Distance (Posters) ( <i>GSA Geoscience Education Division; National Association of Geoscience Teachers</i> )	Exhibit Hall C
28	8 a.m.	T97. Core Analysis of Lake Sediments (Posters) ( <i>GSA Limnogeology Division; ExxonMobil</i> )	Exhibit Hall C
29	1:30 p.m.	Paleontology/Paleobotany I: Macroecology and Fossil Abundance	107-AB
30	1:30 p.m.	Sediments, Carbonates	112-B
31	1:30 p.m.	P4. Holocene Sea Level Change in North America: A Post-Katrina Assessment ( <i>GSA Quaternary Geology and Geomorphology Division; IGCP 495 [Quaternary Land–Ocean Interactions: Driving Mechanisms and Coastal Responses]</i> )	Auditorium Lecture Hall
32	1:30 p.m.	P8. When One Planet Isn't Enough: Celebrating 25 Years of Solar System Exploration ( <i>GSA Planetary Geology Division</i> )	113-C
33	1:30 p.m.	T7. Coal Utilization in the 21st Century: Environmental Issues ( <i>GSA Coal Geology Division; GSA Geology and Society Division; Public Policy; GSA Geobiology and Geomicrobiology Division</i> )	110-AB
34	1:30 p.m.	T31. Geomorphology and Hydrology of Montane Tropical Streams ( <i>GSA Quaternary Geology and Geomorphology Division; GSA Hydrogeology Division</i> )	113-B
35	1:30 p.m.	T63. From the Scientific Revolution to the Enlightenment: Emergence of Modern Geology and Evolutionary Thought from the 16th–18th Century II ( <i>GSA History of Geology Division; Paleontological Society; History of the Earth Sciences Society</i> )	204-B
36	1:30 p.m.	T74. Pharmaceuticals and Other Emerging Contaminants in the Environment—Transport, Fate, and Effects ( <i>GSA Hydrogeology Division</i> )	103-C
37	1:30 p.m.	T76. Detecting and Characterizing Fluxes of Water and Dissolved Constituents across the Groundwater–Surface Water Interface II ( <i>GSA Hydrogeology Division; GSA Limnogeology Division</i> )	103-A
38	1:30 p.m.	T83. Salinization Processes and Problems in Coastal and Inland Aquifers ( <i>GSA Hydrogeology Division</i> )	104-A

## Technical Sessions

NO.	TIME	DESCRIPTION (SPONSORS)	LOCATION
39	1:30 p.m.	T90. Three-Dimensional Geological Mapping for Groundwater Applications ( <i>GSA Hydrogeology Division; GSA Geology and Society Division; GSA Quaternary Geology and Geomorphology Division; GSA Engineering Geology Division</i> )	109-AB
40	1:30 p.m.	T92. Innovations in Characterizing Physical and Chemical Heterogeneity in Sedimentary Aquifers ( <i>GSA Hydrogeology Division</i> )	103-B
41	1:30 p.m.	T101. Petrologic Mineralogy—The Study of Minerals in Context II: In Honor of Charles V. Guidotti ( <i>Mineralogical Society of America</i> )	204-A
42	1:30 p.m.	T107. The EARTHTIME Project II ( <i>Paleontological Society</i> )	204-C
43	1:30 p.m.	T118. Biotic Response to Global Environmental Change: Analogs for the Future of Life on Earth ( <i>Paleontological Society</i> )	104-B
44	1:30 p.m.	T121. Impact Craters: Structures, Drilling, Ages, and Geophysics ( <i>GSA Planetary Geology Division; International Continental Scientific Drilling Program; GSA Geophysics Division; GSA Structural Geology and Tectonics Division; GSA Sedimentary Geology Division</i> )	112-A
45	1:30 p.m.	T123. Geology, Health, and Public Policy ( <i>GSA Geology and Health Division; GSA Geology and Society Division; Public Policy</i> )	108-A
46	1:30 p.m.	T139. Changes in Ocean and Atmospheric Redox State and the Evolution of Life II ( <i>Paleontological Society; GSA Geobiology and Geomicrobiology Division</i> )	105-AB
47	1:30 p.m.	T140. U.S. Atlantic and Gulf Margin Sequences and Hydrostratigraphy	111-AB
48	1:30 p.m.	T143. Outcrop Studies: Fundamental to Lithofacies and Reservoir Characterization ( <i>GSA Sedimentary Geology Division; American Association of Petroleum Geologists</i> )	113-A
49	1:30 p.m.	T145. Unraveling Tectonics: The Power Behind Balanced Cross Sections and Kinematic Reconstructions ( <i>GSA Structural Geology and Tectonics Division</i> )	108-B
50	1:30 p.m.	Environmental Geoscience (Posters)	Exhibit Hall C
51	1:30 p.m.	Geomicrobiology (Posters)	Exhibit Hall C
52	1:30 p.m.	Geoscience Information/Communication (Posters)	Exhibit Hall C
53	1:30 p.m.	Sediments, Clastic (Posters)	Exhibit Hall C
54	1:30 p.m.	Stratigraphy (Posters)	Exhibit Hall C

### Fairmount Water Works Interpretive Center Reception

Tues., 24 Oct., 7–10 p.m.

Do you know the difference between a watershed and a woodshed? Find the answer to that and much, much more during this popular trip to the Fairmount Water Works Interpretive Center. Join us for a casual tour and reception. Trolleys will transport participants from the Pennsylvania Convention Center beginning at 7 p.m. Max: 100; cost: \$40 (includes transportation, two drink tickets, light appetizers, and price of admission to FWWIC).

Please register online at  
[www.geosociety.org/meetings/2006](http://www.geosociety.org/meetings/2006)

or contact

**GSA Sales and Service**  
1-888-443-4472, or +1-303-357-1000, option 3  
to add this event to your registration.



### Beer & Geology Session

Sun., 22 Oct., 7:30–9:30 p.m.

Pennsylvania Convention Center

Cost: US\$20.00

*Come explore the effects of geology  
on the brewing process!*



Rich Wagner, a retired earth science teacher and local brewing historian and expert, will give a keynote talk titled “Beer and Geology—the Philadelphia Story.”

**More activities are being planned!**

For details or to register for this event, go to  
[www.geosociety.org/meetings/2006/eBeer.htm](http://www.geosociety.org/meetings/2006/eBeer.htm)

*You must be 21 years of age with proper identification to participate in the beer sampling portion of this session.*



## Technical Sessions

NO.	TIME	DESCRIPTION (SPONSORS)	LOCATION
55	1:30 p.m.	T4. Marine Geoarchaeology: New Exploration of Sites from Coast to Shelf (Posters) ( <i>GSA Archaeological Geology Division</i> )	Exhibit Hall C
56	1:30 p.m.	T14. Arsenic, Lead, and Mercury in Urban and Rural Watersheds (Posters) ( <i>Public Policy; GSA Geology and Society Division</i> )	Exhibit Hall C
57	6 p.m.	T40. Geohazards—Teachable Moments for Students and the Public: An Illustrated Community Discussion (Posters) ( <i>National Association of Geoscience Teachers; GSA Geoscience Education Division; GSA Geology and Society Division; Public Policy; GSA Engineering Geology Division</i> )	Exhibit Hall C
58	1:30 p.m.	T48. Geology in the National Parks: Research, Mapping, and Resource Management (Posters) ( <i>National Park Service; GSA Geology and Society Division</i> )	Exhibit Hall C
59	1:30 p.m.	T68. Gradients at Hydrologic Interfaces as Indicators of Key Earth-Surface (“Critical-Zone”) Processes (Posters) ( <i>GSA Hydrogeology Division; GSA Geobiology and Geomicrobiology Division; GSA Limnogeology Division</i> )	Exhibit Hall C
60	1:30 p.m.	T82. Reactions at Mineral-Water Interfaces: The Role of Solute Adsorption on Contaminant Co-Adsorption, Mineral Dissolution and Colloid Behavior (Posters) ( <i>GSA Hydrogeology Division</i> )	Exhibit Hall C
61	6 p.m.	T129. Geologic Mapping: Innovations and Interoperability (Posters) ( <i>GSA Geology and Society Division; GSA Quaternary Geology and Geomorphology Division; GSA Hydrogeology Division; GSA Structural Geology and Tectonics Division</i> )	Exhibit Hall C

### MONDAY, 23 OCTOBER 2006

62	8 a.m.	Mineralogy/Crystallography/Metamorphism	112-A
63	8 a.m.	Paleontology/Paleobotany II: Diversity, Turnover, and Extinction	108-A
64	8 a.m.	Paleontology/Paleobotany III: Morphospace and Morphological Patterns	107-AB

## GSA Bookstore Author Event...Don't Miss it!

GSA Bookstore, Headquarters, Exhibit Hall—Just follow the crowd!  
Sun., 22 Oct., 5:30–7:30 p.m.



## Meet the Authors and Have Your Books Signed

### 2006 GUEST AUTHORS

**William J. Broad**—*The Oracle: The Lost Secrets and Hidden Message of Ancient Delphi*—A renegade team of scientists discovers the truth behind the Oracle of Delphi.

**Don't miss this special presentation of research** for *The Oracle*—Mon., 23 Oct., 10 a.m.–noon at the GSA Bookstore.

**Lauret E. Savoy, Eldridge M. Moores, and Judith E. Moores**—*Bedrock: Writers on the Wonders of Geology*—A unique anthology on the literature and art of geology.

**Susan Cummins Miller**—*Quarry*—A new Frankie MacFarlane Mystery.

**Robert Thorson**—*Stone by Stone, The Magnificent History in New England's Stone Walls* and *Exploring Stone Walls: A Field Guide to New England's Stone Walls*—Stone walls tell nothing less than the story of how New England was formed.

Visit the GSA Members' Corner/Combined Publishers Display, featuring books from a wide variety of publishers. Open during Exhibit Hall hours, Sunday through Wednesday.

Have a book you'd like to show?  
Get in touch with us!  
[advertising@geosociety.org](mailto:advertising@geosociety.org).



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## Technical Sessions

NO.	TIME	DESCRIPTION (SPONSORS)	LOCATION
65	8 a.m.	P1. Erosion: Processes, Rates, and New Measuring Techniques ( <i>GSA Quaternary Geology and Geomorphology Division</i> )	Auditorium Lecture Hall
66	8 a.m.	T5. Archaeological and Geoarchaeological Records of Natural and Human-Induced Disasters ( <i>GSA Archaeological Geology Division</i> )	109-AB
67	8 a.m.	T19. Distribution of Arsenic and Related Metalloids in Surface and Ground Waters: Controls and Challenges I ( <i>GSA Hydrogeology Division; GSA Geology and Health Division; GSA Geology and Society Division</i> )	204-B
68	8 a.m.	T23. Multidisciplinary Approaches to Geochemical Problems	110-AB
69	8 a.m.	T28. An Appetite for Apatite: Conodont-Based Geological Investigations in the 21st Century ( <i>Paleontological Society; Pander Society; Geochemical Society</i> )	104-B
70	8 a.m.	T32. Linking Sediment Dynamics and Geomorphology in Tidal Marshes and Estuaries I ( <i>GSA Sedimentary Geology Division</i> )	113-B
71	8 a.m.	T35. Watershed-based Approaches to River Restoration ( <i>GSA Quaternary Geology and Geomorphology Division; GSA Engineering Geology Division</i> )	113-A
72	8 a.m.	T55. Successes in Professional Development of Earth Science Teachers: Courses, Workshops, Partnerships, and Professional Development Opportunities that Work I ( <i>National Association of Geoscience Teachers; GSA Geoscience Education Division</i> )	111-AB
73	8 a.m.	T69. Groundwater Availability and its Sustainability within Regional Aquifer Systems ( <i>GSA Hydrogeology Division; GSA Geology and Society Division</i> )	103-B
74	8 a.m.	T77. Epikarst to Conduits: Quantitative Methods Applied to Monitoring and Modeling of Karst Aquifers ( <i>GSA Hydrogeology Division; Karst Waters Institute</i> )	103-C
75	8 a.m.	T88. Innovative Sensors, Technologies, and Strategies for Performance Monitoring of Waste Disposal Facilities and Remediation Approaches ( <i>GSA Hydrogeology Division; GSA Geophysics Division</i> )	104-A
76	8 a.m.	T95. Dating and Environmental Interpretation of Lake, Loess, and Marine Sediment Sequences using Paleomagnetism and Rock Magnetism ( <i>GSA Limnogeology Division</i> )	204-C
77	8 a.m.	T103. The Terrestrial Eocene–Oligocene Boundary Revisited: A Comparison of Multi-Proxy Records of Paleoenvironmental and Paleoclimatic Change ( <i>Paleontological Society</i> )	105-AB

GSA 2006

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## Geoscience Educators' SOCIAL RECEPTION

Marriott Grand Ballroom, Salon CD  
Saturday, 21 Oct., 5–7 p.m.

The GSA Education Committee, the National Association of Geoscience Teachers (NAGT), the GSA Geoscience Education Division, Cutting Edge, the Digital Library for Earth System Education (DLESE), the IRIS Consortium, the American Geological Institute (AGI), EarthScope, the National Earth Science Teachers Association (NESTA), and UNAVCO would like to invite all educators to a relaxing forum for socializing, sharing ideas, and meeting other geoscience community members interested in education.

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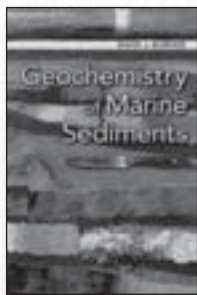
## Technical Sessions

NO.	TIME	DESCRIPTION (SPONSORS)	LOCATION
78	8 a.m.	T108. Stratigraphic Palynology: Applications to Geologic Problems ( <i>American Association of Stratigraphic Palynologists</i> )	112-B
79	8 a.m.	T116. Trilobite Paleobiology and Evolution: In Honor of Brian Chatterton ( <i>Paleontological Society</i> )	113-C
80	8 a.m.	T120. Minerals, Melts, Fluids, and the Evolution of Mountain Belts I: A Tribute to Maria Luisa Crawford ( <i>Mineralogical Society of America</i> )	204-A
81	8 a.m.	T147. NSF Continental Dynamics Field Laboratories I: 20 Years On	108-B
82	8 a.m.	T149. Modern to Precambrian Subduction Systems: Convergent Margin Behavior and Evolution over Geologic Time I ( <i>GSA International Division; GSA Structural Geology and Tectonics Division; GSA Geophysics Division; GSA Sedimentary Geology Division; Integrated Ocean Drilling Program, MARGINS</i> )	103-A
83	8 a.m.	Archaeological Geology (Posters)	Exhibit Hall C
84	8 a.m.	Engineering Geology (Posters)	Exhibit Hall C
85	8 a.m.	Geoscience Education (Posters)	Exhibit Hall C
86	8 a.m.	Hydrogeology (Posters)	Exhibit Hall C
87	8 a.m.	Marine/Coastal Science (Posters)	Exhibit Hall C
88	8 a.m.	T18. Collegiate Watershed Research Projects: Opportunities for Student Learning and Community Involvement (Posters) ( <i>GSA Geoscience Education Division; Council on Undergraduate Research</i> )	Exhibit Hall C
89	8 a.m.	T76. Detecting and Characterizing Fluxes of Water and Dissolved Constituents across the Groundwater–Surface Water Interface (Posters) ( <i>GSA Hydrogeology Division; GSA Limnogeology Division</i> )	Exhibit Hall C
90	1:30 p.m.	Archaeological Geology	109-AB
91	1:30 p.m.	Quaternary Geology	113-A
92	1:30 p.m.	Tectonics I	108-A

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## Technical Sessions

NO.	TIME	DESCRIPTION (SPONSORS)	LOCATION
93	1:30 p.m.	P3. Geosciences and the Media: How Can We Better Communicate the Imperatives of Sustainability? ( <i>GSA Geology and Society Division; Critical Issues Caucus, Geology and Public Policy Committee; GSA Quaternary Geology and Geomorphology Division; GSA Engineering Geology Division; Association of Earth Science Editors</i> )	Auditorium Lecture Hall
94	1:30 p.m.	T19. Distribution of Arsenic and Related Metalloids in Surface and Ground Waters: Controls and Challenges II ( <i>GSA Hydrogeology Division; GSA Geology and Health Division; GSA Geology and Society Division</i> )	204-B
95	1:30 p.m.	T26. Experimental Investigations into Hydrothermal Systems: Implications for Mass Transfer in the Earth's Crust ( <i>Geochemical Society; Society of Economic Geologists; Mineralogical Society of America</i> )	107-AB
96	1:30 p.m.	T32. Linking Sediment Dynamics and Geomorphology in Tidal Marshes and Estuaries II ( <i>GSA Sedimentary Geology Division</i> )	113-B
97	1:30 p.m.	T33. The Impact of Climate Change on Hydrologic and Geomorphic Processes in the Arctic and Subarctic ( <i>GSA Quaternary Geology and Geomorphology Division</i> )	103-B
98	1:30 p.m.	T41. Using Large Experiments and Programs for Education and Outreach: Examples from EarthScope, the Joint Oceanographic Institutions, and Others ( <i>GSA Geoscience Education Division; National Association of Geoscience Teachers</i> )	112-A
99	1:30 p.m.	T55. Successes in Professional Development of Earth Science Teachers: Courses, Workshops, Partnerships, and Professional Development Opportunities that Work II ( <i>National Association of Geoscience Teachers; GSA Geoscience Education Division</i> )	111-AB
100	1:30 p.m.	T59. Geoscience Information: Keys to Discovery ( <i>Geoscience Information Society</i> )	112-B
101	1:30 p.m.	T60. Geoscience Advocacy and Communicating with the Public ( <i>GSA Geology and Society Division; GSA Geoscience Education Division</i> )	105-AB
102	1:30 p.m.	T66. Emerging and Innovative Approaches to Groundwater Modeling ( <i>GSA Hydrogeology Division; National Ground Water Association</i> )	204-C
103	1:30 p.m.	T79. Groundwater Age Dating: Current Issues and Applications ( <i>GSA Hydrogeology Division</i> )	103-C
104	1:30 p.m.	T86. Peatland Patterns and Hydrological Processes: From the Subarctic to the Subtropics ( <i>GSA Hydrogeology Division</i> )	104-A
105	1:30 p.m.	T96. Neogene and Quaternary Biological Paleolimnology: In Memory of J. Platt Bradbury ( <i>GSA Limnogeology Division</i> )	113-C


### ALL Students Invited!

## President's Student Breakfast Reception

Sunday, 22 Oct., 7–8:30 a.m.

Philadelphia Marriott Downtown, Grand Ballroom Salon A–F

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GSA President Stephen G. Wells invites all students registered for the meeting to attend a free breakfast buffet sponsored by ExxonMobil Exploration. Stephen Wells and members of GSA leadership, along with ExxonMobil staff members, will be on hand to answer questions and address student issues. This will also be a time to recognize the Subaru Outstanding Woman in Science awardee, the top-ranked graduate student research grant recipients, as well as

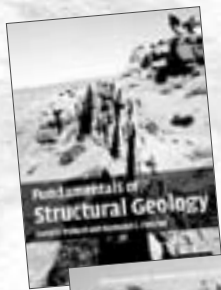
to acknowledge other student research grant recipients and all student Division awardees.

Each student registered for the meeting will receive a complimentary ticket for the breakfast buffet. This is one of the most popular events at the meeting for students, and with good reason! Take this opportunity to network with fellow students, meet the officers of GSA, and recognize fellow student award recipients!



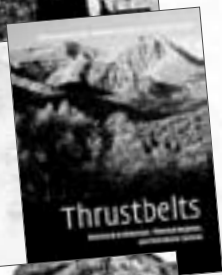
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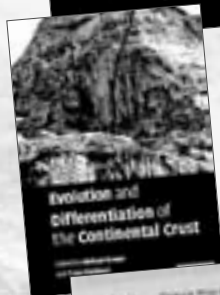


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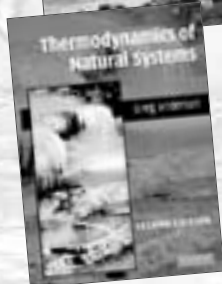
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## Technical Sessions

NO.	TIME	DESCRIPTION (SPONSORS)	LOCATION
106	1:30 p.m.	T106. Devonian–Early Carboniferous Climate Change: Glacial Deposits and Proxy Records ( <i>Society for Sedimentary Geology [SEPM]</i> )	110-AB
107	1:30 p.m.	T120. Minerals, Melts, Fluids, and the Evolution of Mountain Belts II: A Tribute to Maria Luisa Crawford ( <i>Mineralogical Society of America</i> )	204-A
108	1:30 p.m.	T125. Keys to Opportunities with the National Park Service ( <i>National Park Service</i> )	104-B
109	1:30 p.m.	T147. NSF Continental Dynamics Field Laboratories II: 20 Years On	108-B
110	1:30 p.m.	T149. Modern to Precambrian Subduction Systems: Convergent Margin Behavior and Evolution over Geologic Time II ( <i>GSA International Division; GSA Structural Geology and Tectonics Division; GSA Geophysics Division; GSA Sedimentary Geology Division; Integrated Ocean Drilling Program, MARGINS</i> )	103-A
111	1:30 p.m.	Coal Geology (Posters)	Exhibit Hall C
112	1:30 p.m.	T34. Erosion: Processes, Rates, and New Measuring Techniques (Posters) ( <i>GSA Quaternary Geology and Geomorphology Division</i> )	Exhibit Hall C
113	1:30 p.m.	T53. Teaching Instrumentation to Geoscience Students: Course Design, Objectives, and Presentations (Posters) ( <i>GSA Geoscience Education Division; National Association of Geoscience Teachers; Microbeam Analysis Society</i> )	Exhibit Hall C
114	1:30 p.m.	T69. Groundwater Availability and its Sustainability within Regional Aquifer Systems (Posters) ( <i>GSA Hydrogeology Division; GSA Geology and Society Division</i> )	Exhibit Hall C
115	1:30 p.m.	T77. Epikarst to Conduits: Quantitative Methods Applied To Monitoring and Modeling of Karst Aquifers (Posters) ( <i>GSA Hydrogeology Division; Karst Waters Institute</i> )	Exhibit Hall C
116	1:30 p.m.	T85. New Approaches to Understanding the Cycling of Water in Urban Landscapes (Posters) ( <i>GSA Hydrogeology Division; GSA Quaternary Geology and Geomorphology Division; GSA Geology and Society Division</i> )	Exhibit Hall C
117	1:30 p.m.	T91. GPS and InSAR in Groundwater Investigations (Posters) ( <i>GSA Hydrogeology Division</i> )	Exhibit Hall C

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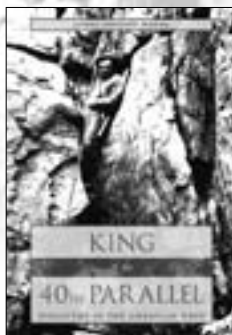
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## Technical Sessions

NO.	TIME	DESCRIPTION (SPONSORS)	LOCATION
118	1:30 p.m.	T101. Petrologic Mineralogy—The Study of Minerals in Context (Posters): In Honor of Charles V. Guidotti ( <i>Mineralogical Society of America</i> )	Exhibit Hall C
119	1:30 p.m.	T121. Impact Craters: Structures, Drilling, Ages, and Geophysics (Posters) ( <i>GSA Planetary Geology Division; International Continental Scientific Drilling Program; GSA Geophysics Division; GSA Structural Geology and Tectonics Division; GSA Sedimentary Geology Division</i> )	Exhibit Hall C

### TUESDAY, 24 OCTOBER 2006

120	8 a.m.	History of Geology Division and History of the Earth Sciences Society Anniversary Celebration	112-A
121	8 a.m.	Paleontology/Paleobotany IV: Early Life and the Cambrian Explosion	107-AB
122	8 a.m.	Paleontology/Paleobotany V: Taphonomy and Exceptional Preservation	104-B
123	8 a.m.	Planetary Geology: Brother Mars, Sister Venus	112-B
124	8 a.m.	Structural Geology II	108-B
125	8 a.m.	P2. Evidence for Long-Term Survival of Microorganisms and Preservation of DNA ( <i>GSA Geobiology and Geomicrobiology Division</i> )	Auditorium Lecture Hall
126	8 a.m.	T3. Reconstructing Landscape Contexts of Human Occupation Surrounding Wetlands ( <i>GSA Archaeological Geology Division; GSA Limnogeology Division; GSA Geology and Society Division</i> )	110-AB
127	8 a.m.	T9. “Ice House”/“Hothouse”—An Analysis of Late Paleozoic Floras and Their Response to Global Climate Change ( <i>GSA Coal Geology Division; The American Association of Stratigraphic Palynologists [AASP]; Paleontological Society; Society for Sedimentary Geology [SEPM]; GSA Geobiology and Geomicrobiology Division</i> )	113-A
128	8 a.m.	T11. Engineering Geology: In Honor of Professor Edward L. Doheny ( <i>Master of Science in Applied Geoscience Graduate Program at the University of Pennsylvania; GSA Engineering Geology Division</i> )	113-C
129	8 a.m.	T19. Distribution of Arsenic and Related Metalloids in Surface and Ground Waters: Controls and Challenges III ( <i>GSA Hydrogeology Division; GSA Geology and Health Division; GSA Geology and Society Division</i> )	204-B

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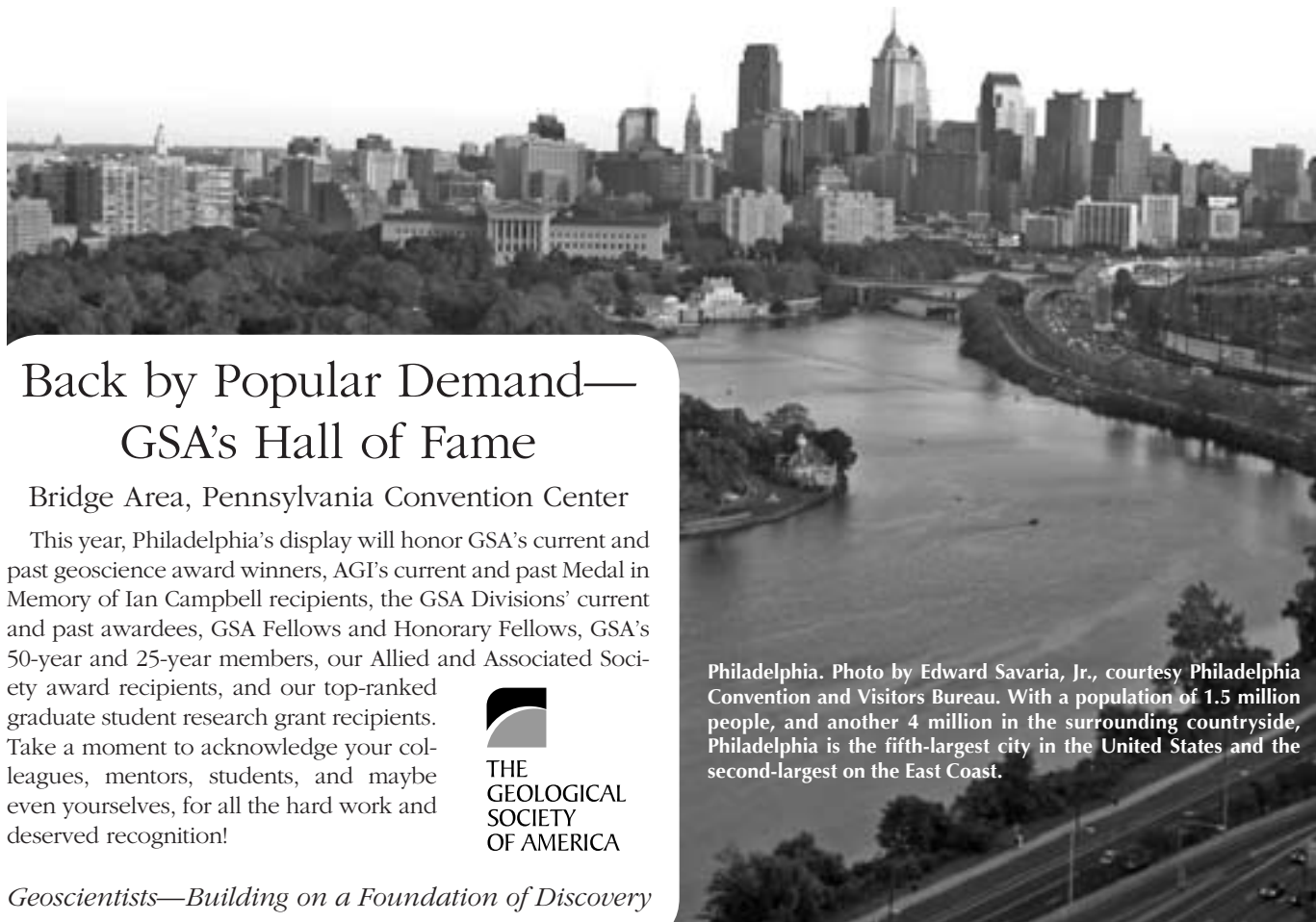
## Technical Sessions

NO.	TIME	DESCRIPTION (SPONSORS)	LOCATION
130	8 a.m.	T30. Quaternary Micropaleontology: Quantifying Environmental Change ( <i>Cushman Foundation; GSA Geobiology and Geomicrobiology Division</i> )	204-C
131	8 a.m.	T42. Visualization in the Geosciences ( <i>GSA Geoscience Education Division; National Association of Geoscience Teachers; GSA Engineering Geology Division</i> )	111-AB
132	8 a.m.	T71. Groundwater's Role in the Survival of Threatened and Endangered Ecosystems ( <i>GSA Hydrogeology Division</i> )	103-B
133	8 a.m.	T72. Heat as a Natural Tracer in Hydrologic Systems: Current Understanding, Innovation, and Application ( <i>GSA Hydrogeology Division</i> )	104-A
134	8 a.m.	T75. Chemical and Hydrological Interactions in the Evolution and Control of Coal and Metal Mine Drainage I ( <i>GSA Hydrogeology Division; Geochemical Society; GSA Coal Geology Division</i> )	103-C
135	8 a.m.	T80. Impact of Past Glaciations and Climate on Present-Day Subsurface Water Resources: Geochemical, Hydrogeological, and Modeling Studies ( <i>GSA Hydrogeology Division</i> )	103-A
136	8 a.m.	T98. Identifying Our Most Vulnerable Shorelines: Science and Policy ( <i>GSA Geology and Society Division</i> )	109-AB
137	8 a.m.	T109. Mass Extinctions: New Approaches Analyzing Process Links between Land and Sea ( <i>Paleontological Society; GSA Geobiology and Geomicrobiology Division</i> )	105-AB
138	8 a.m.	T117. Life on Late Devonian Continents—Organisms and Ecosystems in Transition: In Honor of James Richard “Dick” Beerbower ( <i>Paleontological Society</i> )	204-A
139	8 a.m.	T119. Crustal Melt Flow in Orogenic Belts: Integrated Field, Microstructural, Geochemical, and Geochronological Analysis of Migmatites and Associated Granites ( <i>Mineralogical Society of America</i> )	113-B
140	8 a.m.	T150. Understanding Mountain Belts from Basin-Fill: Multidisciplinary Approaches to the Detrital Record of Orogenic Evolution	108-A
141	8 a.m.	Economic Geology (Posters)	Exhibit Hall C
142	8 a.m.	Geophysics/Tectonophysics/Seismology (Posters)	Exhibit Hall C
143	8 a.m.	T22. Sigma Gamma Epsilon Student Research (Posters) ( <i>Sigma Gamma Epsilon</i> )	Exhibit Hall C
144	8 a.m.	T45. Service Learning and Community Service in Earth Science Courses: Community Involvement in Earth Science Education (Posters) ( <i>National Association of Geoscience Teachers; GSA Geoscience Education Division</i> )	Exhibit Hall C
145	8 a.m.	T51. G–K12 (Graduate–K–12) Education: Improving Understanding of Geologic Concepts at All Levels (Posters) ( <i>GSA Geoscience Education Division; National Association of Geoscience Teachers</i> )	Exhibit Hall C
146	8 a.m.	T52. Preparing Future K–12 Teachers of Earth Science (Posters) ( <i>GSA Geoscience Education Division; National Association of Geoscience Teachers</i> )	Exhibit Hall C
147	8 a.m.	T123. Geology, Health, Forensics, and Public Policy (Posters) ( <i>GSA Geology and Health Division; GSA Geology and Society Division; Public Policy</i> )	Exhibit Hall C
148	8 a.m.	T150. Understanding Mountain Belts from Basin-Fill: Multidisciplinary Approaches to the Detrital Record of Orogenic Evolution (Posters)	Exhibit Hall C
149	1:30 p.m.	Economic Geology	104-A
150	1:30 p.m.	Engineering Geology	103-C
151	1:30 p.m.	Marine/Coastal Science	109-AB
152	3 p.m.	MSA Awards Lectures, Presidential Address, Annual Business Meeting	204-C
153	1:30 p.m.	Paleoclimatology/Paleoceanography I: Proxy Evaluations	108-A
154	1:30 p.m.	Paleontology/Paleobotany VI: Ancient Terrestrial Ecosystems	107-AB
155	1:30 p.m.	Paleontology/Paleobotany VII: Phylogeny, Systematics, and Evolution	104-B
156	1:30 p.m.	Precambrian Geology	112-B
157	1:30 p.m.	Stratigraphy	110-AB
158	1:30 p.m.	P5. Links between Geological Processes, Microbial Activities, and Evolution of Life ( <i>GSA International Division; GSA Geobiology and Geomicrobiology Division; GSA Geology and Society Division; GSA Structural Geology and Tectonics Division</i> )	Auditorium Lecture Hall
159	1:30 p.m.	T6. Geoarchaeology of Prehistoric Earthworks ( <i>GSA Archaeological Geology Division</i> )	111-AB
160	1:30 p.m.	T8. U.S. Energy Resources: Options, Scenarios, and Policy ( <i>GSA Coal Geology Division; Public Policy</i> )	113-A
161	1:30 p.m.	T27. Better Living through Geochemistry: Fostering an Understanding of Terrestrial Paleoenvironments and Paleoclimates ( <i>GSA Sedimentology Division; Society for Sedimentary Geology [SEPM]; Geochemical Society</i> )	112-A
162	1:30 p.m.	T52. Preparing Future K–12 Teachers of Earth Science ( <i>GSA Geoscience Education Division; National Association of Geoscience Teachers</i> )	113-B



## Technical Sessions

NO.	TIME	DESCRIPTION (SPONSORS)	LOCATION
163	4:30 p.m.	T75. Chemical and Hydrological Interactions in the Evolution and Control of Coal and Metal Mine Drainage II ( <i>GSA Hydrogeology Division; Geochemical Society; GSA Coal Geology Division</i> )	103-C
164	1:30 p.m.	T110. Magnetostratigraphy of Critical Intervals in Earth History: Contributions to Geochronology, Geobiology, Paleogeography, and Global Change ( <i>GSA Geophysics Division; GSA Sedimentary Geology Division; GSA Geobiology and Geomicrobiology Division; Society for Sedimentary Geology [SEPM]</i> )	103-A
165	1:30 p.m.	T111. The Late Cretaceous–Early Tertiary Interval in the Atlantic Coastal Plain ( <i>Paleontological Society</i> )	105-AB
166	1:30 p.m.	T114. The Dynamic Reef and Shelly Communities of the Paleozoic: A Tribute to the Research Career of Paul Copper ( <i>Paleontological Society</i> )	204-A
167	1:30 p.m.	T122. Asteroids, Meteorites and the Early History of the Solar System—G.K. Gilbert Award Session ( <i>GSA Planetary Geology Division</i> )	204-B
168	1:30 p.m.	T124. Forensic Geoscience: In Practice and in Teaching ( <i>GSA Geoscience Education Division; GSA Geology and Health Division; GSA Geology and Society Division</i> )	113-C
169	1:30 p.m.	T138. Using Detrital Zircon Geochronology to Answer Geologic Questions We Formerly Could Not Ask ( <i>GSA Sedimentary Geology Division; Society for Sedimentary Geology [SEPM]</i> )	108-B
170	1:30 p.m.	Structural Geology (Posters)	Exhibit Hall C
171	1:30 p.m.	Tectonics (Posters)	Exhibit Hall C
172	1:30 p.m.	T19. Distribution of Arsenic and Related Metalloids in Surface and Ground Waters: Controls and Challenges (Posters) ( <i>GSA Hydrogeology Division; GSA Geology and Health Division; GSA Geology and Society Division</i> )	Exhibit Hall C
173	1:30 p.m.	T42. Visualization in the Geosciences (Posters) ( <i>GSA Geoscience Education Division; National Association of Geoscience Teachers; GSA Engineering Geology Division</i> )	Exhibit Hall C
174	1:30 p.m.	T46. Teaching Hydrogeology in the 21st Century (Posters) ( <i>GSA Hydrogeology Division; National Association of Geoscience Teachers; GSA Education Division</i> )	Exhibit Hall C



### Back by Popular Demand— GSA's Hall of Fame

Bridge Area, Pennsylvania Convention Center

This year, Philadelphia's display will honor GSA's current and past geoscience award winners, AGU's current and past Medal in Memory of Ian Campbell recipients, the GSA Divisions' current and past awardees, GSA Fellows and Honorary Fellows, GSA's 50-year and 25-year members, our Allied and Associated Society award recipients, and our top-ranked graduate student research grant recipients. Take a moment to acknowledge your colleagues, mentors, students, and maybe even yourselves, for all the hard work and deserved recognition!



Philadelphia. Photo by Edward Savaria, Jr., courtesy Philadelphia Convention and Visitors Bureau. With a population of 1.5 million people, and another 4 million in the surrounding countryside, Philadelphia is the fifth-largest city in the United States and the second-largest on the East Coast.

*Geoscientists—Building on a Foundation of Discovery*

## Technical Sessions

NO.	TIME	DESCRIPTION (SPONSORS)	LOCATION
175	1:30 p.m.	T66. Emerging and Innovative Approaches to Groundwater Modeling (Posters) ( <i>GSA Hydrogeology Division; National Ground Water Association</i> )	Exhibit Hall C
176	1:30 p.m.	T75. Chemical and Hydrological Interactions in the Evolution and Control of Coal and Metal Mine Drainage (Posters) ( <i>GSA Hydrogeology Division; Geochemical Society; GSA Coal Geology Division</i> )	Exhibit Hall C
177	1:30 p.m.	T94. The Spatial and Temporal Variability of Groundwater Recharge (Posters) ( <i>GSA Hydrogeology Division</i> )	Exhibit Hall C
178	1:30 p.m.	T115. Fossil Behavior (Posters): In Honor of Adolf Seilacher ( <i>Paleontological Society</i> )	Exhibit Hall C

### WEDNESDAY, 25 OCTOBER 2006

179	8 a.m.	Geochemistry, Aqueous	111-AB
180	8 a.m.	Geomorphology I	110-AB
181	8 a.m.	Paleontology/Paleobotany VIII: Preservational Bias and Experimental Taphonomy	107-AB
182	8 a.m.	Paleontology/Paleobotany IX: Fossil Distributions in Time and Space	112-A
183	8 a.m.	Petrology, Igneous	112-B
184	8 a.m.	Tectonics II	113-B
185	8 a.m.	P7. Using Historical Photographs and Maps to Document Landscape Evolution and the Impacts of Changing Climate: A Celebration of the 96th Birthday of Bradford Washburn	Auditorium Lecture Hall
186	8 a.m.	T2. Alluvial Geoarchaeology of Large River Valleys I ( <i>GSA Archaeological Geology Division</i> )	109-AB
187	8 a.m.	T25. Water-Quality Issues in Sole-Source and Principal Aquifers in the United States ( <i>GSA Hydrogeology Division; National Ground Water Association</i> )	104-B
188	8 a.m.	T36. Surficial Processes at the Hyperarid Limit: Current Research in the Atacama Desert, Chile I ( <i>GSA Geobiology and Geomicrobiology Division</i> )	113-A
189	8 a.m.	T54. Translating Earth: Conceptions Research in Earth Science Education ( <i>GSA Geoscience Education Division; National Association of Geoscience Teachers</i> )	108-B
190	8 a.m.	T56. Successful Strategies for Recruiting and Retaining Undergraduate Geoscience Majors ( <i>National Association of Geoscience Teachers; GSA Education Division</i> )	108-A
191	8 a.m.	T70. Groundwater Flow and Contaminant Fate, Transport, and Remediation in Fractured Soil, Sediment, and Rock ( <i>GSA Hydrogeology Division</i> )	103-C
192	8 a.m.	T78. Geochemical and Hydrologic Linkages between Shallow and Deep Groundwaters ( <i>GSA Hydrogeology Division; GSA Geobiology and Geomicrobiology Division</i> )	104-A
193	8 a.m.	T87. Stream-Hyporheic Interactions: Hydrology, Geochemistry, and Biology ( <i>GSA Hydrogeology Division; GSA Quaternary Geology and Geomorphology Division; GSA Geobiology and Geomicrobiology Division</i> )	103-A
194	8 a.m.	T94. The Spatial and Temporal Variability of Groundwater Recharge ( <i>GSA Hydrogeology Division</i> )	103-B
195	8 a.m.	T105. Paleosols, Proxies, and Paleoenvironments I	204-B
196	8 a.m.	T112. Extinction, Dwarfing, and the Lilliput Effect ( <i>Paleontological Society</i> )	105-AB
197	8 a.m.	T115. Fossil Behavior I: In Honor of Adolf Seilacher ( <i>Paleontological Society</i> )	204-A
198	8 a.m.	T137. Epi-Continental Seas in the Geological Record: The Limitations of the Uniformitarian Paradigm I	204-C
199	8 a.m.	T144. Deformation in Sedimentary Rocks I: A Tribute to Richard H. Groshong Jr. ( <i>GSA Structural Geology and Tectonics Division</i> )	113-C
200	8 a.m.	Geochemistry, Organic (Posters)	Exhibit Hall C
201	8 a.m.	Geochemistry, Other (Posters)	Exhibit Hall C
202	8 a.m.	Paleoclimatology/Paleoceanography: Proxies, Patterns, and Processes (Posters)	Exhibit Hall C
203	8 a.m.	Precambrian Geology (Posters)	Exhibit Hall C
204	8 a.m.	T44. Beyond the Content: Teaching Scientific and Citizenship Skills in the Geosciences (Posters) ( <i>National Association of Geoscience Teachers; GSA Geoscience Education Division</i> )	Exhibit Hall C
205	8 a.m.	T57. We Can Do Better: Alternatives to the Same Old Lab-Lecture Format in the College Classroom (Posters) ( <i>National Association of Geoscience Teachers; GSA Geoscience Education Division</i> )	Exhibit Hall C
206	8 a.m.	T134. Back to the Future of Sedimentary Geology: Student Research in Sedimentary Geology (Posters) ( <i>GSA Sedimentary Geology Division</i> )	Exhibit Hall C
207	8 a.m.	T138. Using Detrital Zircon Geochronology to Answer Geologic Questions We Formerly Could Not Ask (Posters) ( <i>GSA Sedimentary Geology Division; Society for Sedimentary Geology [SEPM]</i> )	Exhibit Hall C
208	1:30 p.m.	Geochemistry, Other	111-AB

## Technical Sessions

NO.	TIME	DESCRIPTION (SPONSORS)	LOCATION
209	1:30 p.m.	Geomorphology II	110-AB
210	1:30 p.m.	Geoscience Education	112-B
211	1:30 p.m.	Paleoclimatology/Paleoceanography II: Proxy Reconstructions	107-AB
212	1:30 p.m.	Paleontology/Paleobotany X: Marine Ecological Dynamics	108-B
213	1:30 p.m.	Public Policy: Critical Issues—Geoheritage, Geocommunication, and Geoeducation	103-C
214	1:30 p.m.	Sediments, Clastic	112-A
215	1:30 p.m.	T2. Alluvial Geoarchaeology of Large River Valleys II ( <i>GSA Archaeological Geology Division</i> )	109-AB
216	1:30 p.m.	T36. Surficial Processes at the Hyperarid Limit: Current Research in the Atacama Desert, Chile II ( <i>GSA Geobiology and Geomicrobiology Division</i> )	113-A
217	1:30 p.m.	T57. We Can Do Better: Alternatives to the Same Old Lab-Lecture Format in the College Classroom ( <i>National Association of Geoscience Teachers; GSA Geoscience Education Division</i> )	113-B
218	1:30 p.m.	T65. Detection of Voids, Tunnels, and Collapse Features ( <i>GSA Hydrogeology Division; GSA Geophysics Division; Karst Waters Institute; GSA Engineering Geology Division</i> )	103-B
219	1:30 p.m.	T81. Physical, Chemical, and Biological Controls on Remediation of Chlorinated Solvents in Fractured Rock ( <i>GSA Hydrogeology Division; GSA Geobiology and Geomicrobiology Division</i> )	105-AB
220	1:30 p.m.	T84. Novel Applications of Tracers to Characterize and Distinguish Multiple Transport Phenomena at Various Scales ( <i>GSA Hydrogeology Division</i> )	103-A
221	1:30 p.m.	T105. Paleosols, Proxies, and Paleoenvironments II	204-B
222	1:30 p.m.	T113. Applied Reef Coral Paleoecology ( <i>Paleontological Society</i> )	108-A
223	1:30 p.m.	T115. Fossil Behavior II: In Honor of Adolf Seilacher ( <i>Paleontological Society</i> )	204-A
224	1:30 p.m.	T133. Late Permian–Early Triassic Earth ( <i>Paleontological Society</i> )	104-B
225	1:30 p.m.	T137. Epi-Continental Seas in the Geological Record: The Limitations of the Uniformitarian Paradigm II	204-C



### ANNUAL Campus Representatives Appreciation Breakfast

Mon., 23 Oct. 2006, 7:00–8:30 a.m.  
Pennsylvania Convention Center  
Room 203A

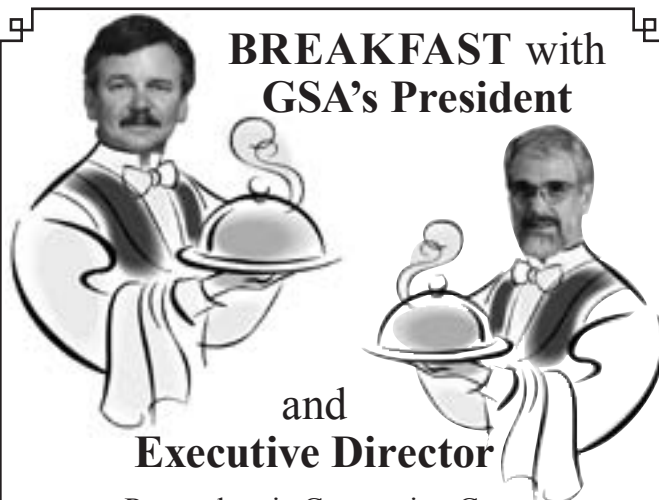
**GSA Campus Reps:** Please join us for breakfast before you head off to the technical sessions. This is an informal event, conveniently located in the convention center.

- Network with other campus representatives
- Talk about GSA membership and program opportunities for students
- Share your ideas with GSA staff hosts

Admission is free, but we ask that you register in order to help us make catering plans. To register, check “306. Campus Reps. Coffee Reception” on your registration form.



**THANK YOU, GSA CAMPUS REPRESENTATIVES**



### BREAKFAST with GSA's President

### and Executive Director

Pennsylvania Convention Center  
Guest Hospitality Suite  
Mon., 23 October, 8–8:30 a.m.



Come to the Guest Hospitality Suite to meet GSA President Steve Wells and GSA Executive Director Jack Hess. Breakfast will be provided for those guests who have paid the guest program registration fee.

## Technical Sessions

NO.	TIME	DESCRIPTION (SPONSORS)	LOCATION
226	1:30 p.m.	T144. Deformation in Sedimentary Rocks II: A Tribute to Richard H. Groshong Jr. ( <i>GSA Structural Geology and Tectonics Division</i> )	113-C
227	1:30 p.m.	Geochemistry, Aqueous (Posters)	Exhibit Hall C
228	1:30 p.m.	Mineralogy/Crystallography (Posters)	Exhibit Hall C
229	1:30 p.m.	Neotectonics/Paleoseismology (Posters)	Exhibit Hall C
230	1:30 p.m.	Paleontology/Paleobotany (Posters) II: Fossils in Time, Space, and Morphospace	Exhibit Hall C
231	1:30 p.m.	Petrology, Igneous (Posters)	Exhibit Hall C
232	1:30 p.m.	Petrology, Metamorphic (Posters)	Exhibit Hall C
233	1:30 p.m.	Remote Sensing/Geographic Information System (Posters)	Exhibit Hall C
234	1:30 p.m.	Volcanology (Posters)	Exhibit Hall C
235	1:30 p.m.	T49. Building New and Rebuilding Defunct College and University Geoscience Programs for the 21st Century: Challenges and Opportunities, Successes and Failures (Posters) ( <i>GSA Geoscience Education Division; National Association of Geoscience Teachers</i> )	Exhibit Hall C
236	1:30 p.m.	T120. Minerals, Melts, Fluids, and the Evolution of Mountain Belts (Posters): A Tribute to Maria Luisa Crawford ( <i>Mineralogical Society of America</i> )	Exhibit Hall C

### Annual Meeting Sponsor



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## ➤ Philadelphia 2006 K-12 Education Events ◀

### **SPECIAL K-12 TEACHER DAY FIELD TRIP AND WORKSHOP SHARE-A-THON**

Sat., 21 Oct., 8 a.m.–5 p.m.

Cosponsored by GSA Geoscience Education Division

Calling all K-12 teachers and pre-service students! Join us for a day-long K-12 event. We will begin with an urban field trip through parts of Philadelphia, where we will observe various rocks and other natural building materials as they are used for construction and architectural aesthetics. Search for fossils on building faces, find the rare Pennsylvania blue-stone, and measure microclimates and noise that is enhanced or mitigated by building designs. In the afternoon workshop share-a-thon, you can network with fellow teachers and geologists, pick up new lesson ideas, and be inspired by guest speakers who will share their stories. Guest passes to the opening of the Exhibit Hall will be available to participants. The participation fee for the entire day is only US\$15 and includes lunch and giveaways. The registration form is available online at [www.physics.purdue.edu/gsa/](http://www.physics.purdue.edu/gsa/). This promises to be both entertaining and informative, so plan to join us for Teacher Day at GSA!

### **K-12 SHORT COURSE**

Using Authentic Scientific Ocean Drilling Data for Earth Systems Science Inquiry [601]

Sun., 22 Oct., 9 a.m.–5 p.m. Cosponsored by Joint Oceanographic Institutions; GSA Geoscience Education Division.

### **GEOSCIENCE EDUCATORS' SOCIAL RECEPTION**

Sat., 21 Oct., 5–7 p.m.

Come meet the GSA Education Staff! Appetizers and cash bar provided. See page 22 of this issue for more information.



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OF AMERICA



## ↔ Guest Program ↔

### Guest Hospitality Suite

Sun.–Wed., 8 a.m.–5:30 p.m.

### Pennsylvania Convention Center

We extend a warm welcome to all guests at the 2006 GSA Annual Meeting in Philadelphia! The guest or spouse registration fee of US\$80 per person (before 18 Sept.; US\$85 after 18 Sept.) is for nongeologist spouses or friends of professional and/or student meeting registrants. Registered guests are invited to visit the Guest Hospitality Suite, a resource center with abundant information on Philadelphia and the surrounding areas. Local experts will be on hand to answer your questions, and light refreshments will be served throughout the day. We hope you enjoy your stay in Philadelphia!

**Badges:** While at the Pennsylvania Convention Center, please wear your GSA guest badge. It is required for admission to the Guest Hospitality Suite and the Exhibit Hall.

**Exhibit Hall:** Guest registration includes access to the Exhibit Hall.

**Refreshments:** Refreshments in the Guest Hospitality Suite are reserved only for those who have paid the guest registration fee.

**Technical Sessions:** The guest registration fee does not provide access to technical sessions. Any guest wishing to see a specific presentation should sign in with the hostess in the Guest Hospitality Suite.

### TOURS

*You must be registered for either the entire GSA meeting or the Guest Program in order to participate in guest tours, seminars, and activities.*

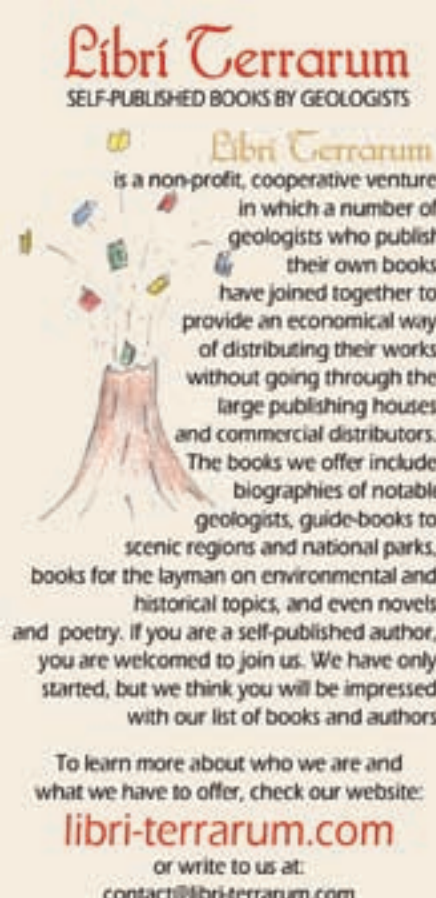
All guest tours depart from and return to the Pennsylvania Convention Center. **Please arrive 15 to 20 minutes before scheduled departure.** The Philadelphia area has a great deal to offer, and the formal tours can only cover a small portion of what is available to see and do. You may enjoy visiting other area attractions with fellow guest attendees or go it alone on a self-guided tour. The Guest Hospitality Suite hostess and the Philadelphia Convention & Visitors Bureau representatives can provide you with more information and activity suggestions.

### Ticketed Tours

Tickets are being sold in advance for the following tours. However, please check in at the registration desk, located in Grand Hall of the Pennsylvania Convention Center, for ticket availability.

	TIME	COST
<b>SUNDAY, 22 OCT.</b>		
Philadelphia Mural Tour [101]	1 p.m.–3 p.m.	US\$53
Best of Philadelphia Half-Day Tour [102]	1 p.m.–4 p.m.	US\$43
<b>MONDAY, 23 OCT.</b>		
Picnic and History Tour of Laurel Hill Cemetery [103]	10 a.m.–1 p.m.	US\$53
Best of Philadelphia Tour with Lunch on Your Own at the City Tavern [104]	9 a.m.–3 p.m.	US\$58
Amish Countryside Tour [105]	8 a.m.–4 p.m.	US\$118
<b>TUESDAY, 24 OCT.</b>		
Fairmount Park Houses Tour [106]	9 a.m.–noon	US\$40

(continued next page)



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Libri Terrarum is a non-profit, cooperative venture in which a number of geologists who publish their own books have joined together to provide an economical way of distributing their works without going through the large publishing houses and commercial distributors. The books we offer include biographies of notable geologists, guide-books to scenic regions and national parks, books for the layman on environmental and historical topics, and even novels and poetry. If you are a self-published author, you are welcomed to join us. We have only started, but we think you will be impressed with our list of books and authors.

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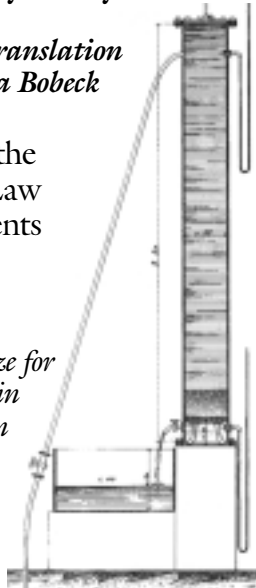
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(Guest Program continued)

	TIME	COST
The Academy of Natural Sciences & Museum of Archaeology and Anthropology: Natural History Museum Tour [107]	9 a.m.–5 p.m.	US\$58
Winterthur and Longwood Gardens Tour [108]	8 a.m.–4 p.m.	US\$73

### WEDNESDAY, 25 OCT.

Morris Arboretum and the Valley Green Inn [109]	9 a.m.–2 p.m.	US\$73
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### Guest Seminars

Payment of the guest registration fee entitles you to also attend the following seminars, offered at no additional charge.

#### Introduction to Philadelphia

Pennsylvania Convention Center

Sun., 22 Oct., 10–11 a.m.

This is your roadmap to the ins and outs of Philadelphia. Enjoy an overview of what the city has to offer. Your introduction will begin with a short video presentation narrated by Philly's favorite celebrities, including Bill Cosby and Kevin Bacon. Guests hoping to find the best Philly cheesesteak or a Philadelphia dining hot spot will have an opportunity to ask questions and get acquainted with the best of Philly. This tour guide–led overview will give you a taste of Philadelphia culture, history, and current events. Don't miss out on Philadelphia's favorite traditions. This light discussion about Philadelphia's highlights will help you to prioritize and plan your sight-seeing itinerary.

#### Shop Philadelphia

Pennsylvania Convention Center

Mon., 23 Oct., 10–11 a.m.

This seminar will be a road map for shopping success in Philadelphia. Our professional image consultant/shopping extraordinaire will show guests where to shop in Philly. Whether bargain-hunting or trend-trotting, guests will get the inside scoop on Philly's shopping experience. From the Gallery to Antique Row, guests can ask questions and find the perfect fit. Coupons to the area's favorite stores will be provided at the end of the seminar.

#### Heart to Hearth

Pennsylvania Convention Center

Tues., 24 Oct., 10–11 a.m.

Susan Plaisted, culinary historian, guides guests through an exploration of colonial cooking methods and practices. Guests discover the dining habits of famed Philadelphians Ben Franklin and English Quaker William Penn (the founder and first Governor of Pennsylvania), with visuals of favorite beverages and seasonal bills of fare. This slide series brings the audience to the bake-and-brew house of Pennsbury Manor to show colonial preparation techniques and finished products.



### FUTURE GSA ANNUAL MEETINGS



2007 Denver, Colo. (28–31 October)

2008\* Houston, Tex. (5–8 October)

2009 Portland, Ore. (18–21 October)

2010 Denver, Colo. (31 Oct.–3 Nov.)

2011 Minneapolis, Minn. (9–12 October)

\*Joint meeting with American Society of Agronomy, Crop Science Society of America, and Soil Science Society of America.

## ➤ Registration ◀

**New this year!**

Online registration will be open throughout the meeting: [www.geosociety.org/meetings/2006](http://www.geosociety.org/meetings/2006)

### Early Registration deadline: 18 September

Registration via mail or fax will be open through **16 October** at standard registration rates.

**Mail:** GSA, P.O. Box 9140, Boulder, CO 80301-9140, USA

**Fax:** +1-303-357-1071

After 16 October, registration by mail, fax, or phone will not be accepted. Instead, please plan to register online or on-site at the Pennsylvania Convention Center, Grand Hall, starting Saturday, 22 Oct., at 7 a.m.

### Badges

#### Did you register before 25 September?

If you are in the United States and signed up for the full meeting, your confirmation and badge will be mailed to you about two weeks before the meeting. **IMPORTANT: Remember to bring your badge and registration confirmation with you to the meeting.** Badge holders and programs will be available at the Pennsylvania Convention Center, Grand Hall, starting on Sat., 22 Oct. at 7 a.m. If you are only registered for one day, you must pick up your badge at the registration desk. For your convenience, there will also be badge holders and programs in the Loews Philadelphia Hotel and the Philadelphia Marriott Downtown Hotel.

#### Did you register after 25 September, or are you outside of the United States?

Please pick up your badge, badge holder, and program on-site at the GSA registration desk located in the Grand Hall of the Pennsylvania Convention Center beginning Sat., 22 Oct., at 7 a.m.



## ROADSIDE GEOLOGY OF OHIO

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## GSA's Third Annual FREE Research Proposal Writing Workshop



If you are interested in improving your chances of receiving a GSA student research grant or are looking for tips to improve your proposal writing for future funding, come join GSA's proposal-writing workshop aimed specifically at graduate students.

Led by a member of the GSA Research Grant Committee, this workshop will be based on recent GSA graduate research grant proposals and will put several examples into hypothesis-driven studies to illustrate the dos and don'ts of the proposal-writing process. A brief overview of the review process by the GSA research grant committee will also be outlined. Please check [www.geosociety.org/grants](http://www.geosociety.org/grants) for updates on the date, time, and location.



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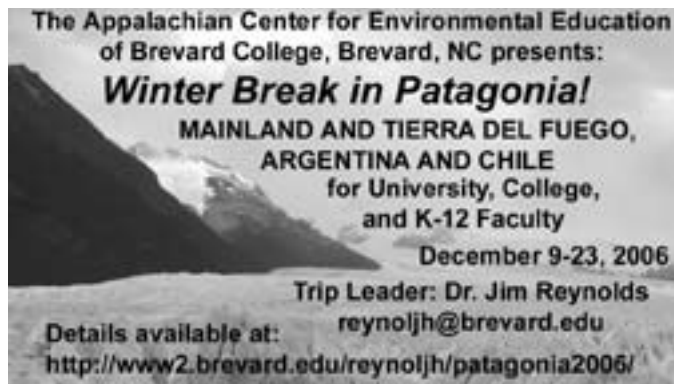
## ➤ Graduate School Information Forum ⇐

### Pennsylvania Convention Center, Exhibit Hall

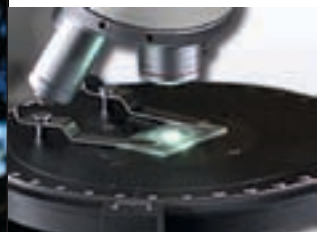
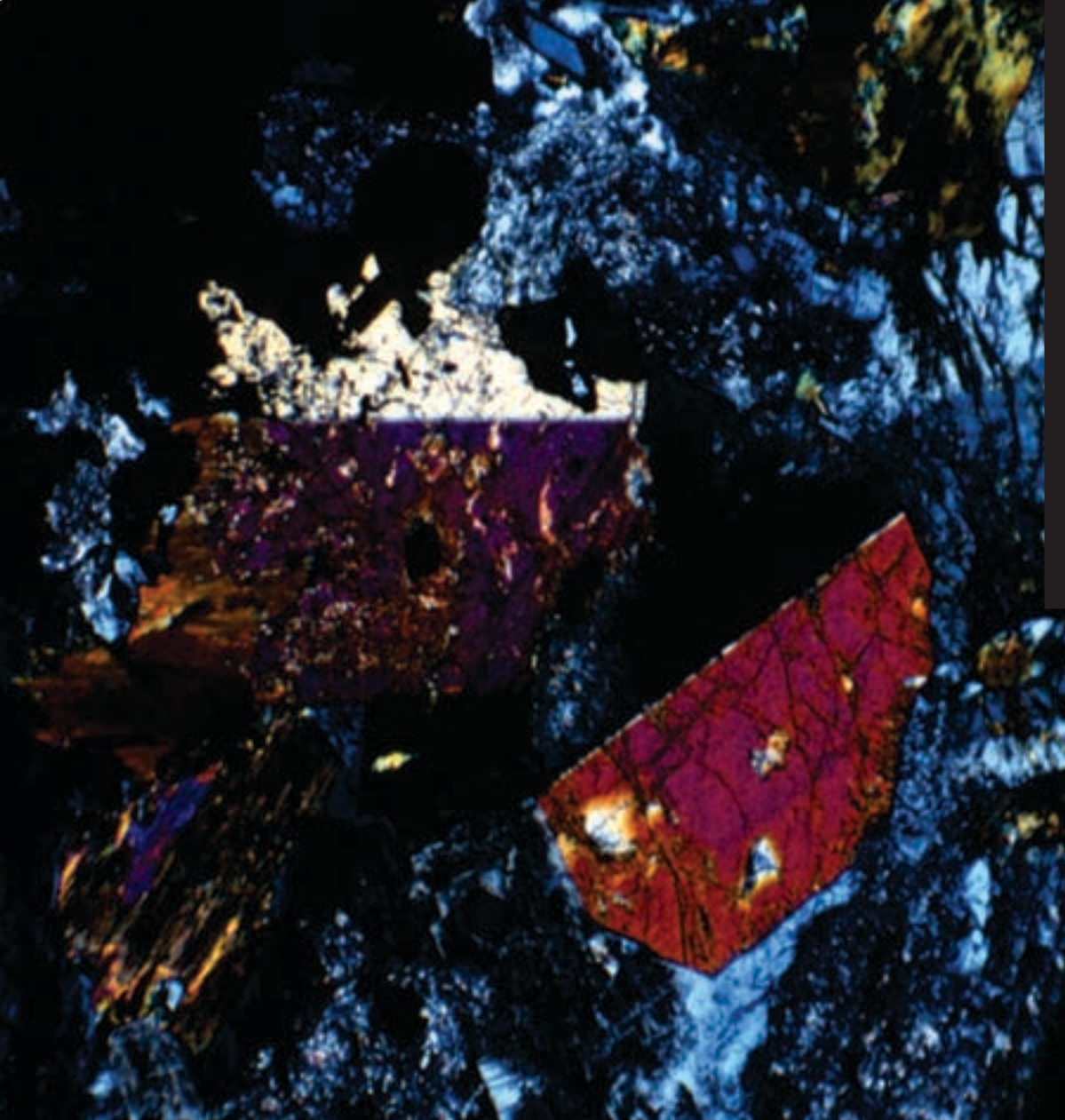
Sun., 22 Oct., 8 a.m.–7:30 p.m.; Mon.–Wed., 23–25 Oct., 8 a.m.–5:30 p.m.

Searching for the right graduate school? Meet with university representatives from across the nation at GSA's Graduate School Information Forum. The participating schools (as of press time) are listed below. For a complete list of schools, contact Kevin Ricker at +1-303-357-1090, [kricker@geosociety.org](mailto:kricker@geosociety.org). To check if a school has a booth in the Exhibit Hall, go to <http://rock.geosociety.org/gsif/>.

INSTITUTION	SUN.	MON.	TUES.	WED.	INSTITUTION	SUN.	MON.	TUES.	WED.
Binghamton University		x			University of Alabama		x		
Boise State University	x	x	x		University of California at Riverside	x	x		
Bowling Green State University	x				University of Connecticut	x			
Colorado School of Mines	x				University of Delaware	x			
Duke University	x	x	x	x	University of Idaho	x			
Indiana University	x	x	x		University of Iowa		x		
Iowa State University	x				University of Kansas	x	x		
Kent State University	x	x	x		University of Maryland	x	x		
Miami University	x	x			University of Massachusetts		x		
Montana State University	x	x	x	x	University of Michigan	x	x	x	
Northwestern University		x			University of Montana	x	x		
Ohio State University	x	x	x		University of Nebraska	x			
Ohio University		x			University of North Carolina– Wilmington		x		
Oregon State University	x	x			University of Notre Dame	x	x	x	
Pennsylvania State University		x	x		University of Pennsylvania	x	x		
Princeton University		x	x		University of Texas–El Paso	x	x	x	
Purdue University	x	x			University of Wisconsin–Madison	x	x	x	
Syracuse University	x	x	x		Utah State University	x	x		
Temple University	x	x	x	x	Virginia Tech	x	x	x	
Texas Tech University	x	x			Yale University	x	x		
Tulane University	x	x	x						







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MICROSYSTEMS

## ➤ Travel & Transportation ◀



### Traveling to Philadelphia

Philadelphia is easy to reach by car, train, bus, or air. I-95 runs north and south through Philadelphia. You can also access the region via the Pennsylvania and New Jersey turnpikes. By car, Philadelphia is just two hours from New York City and Baltimore and just under three hours from Washington D.C. Amtrak operates from Philadelphia's 30th Street Station with service along the north-east corridor, and regional bus service is available via Greyhound. Philadelphia International Airport is served by most major airlines, and with the arrival of several new discount carriers, service to Philadelphia is more affordable and convenient than ever.

#### TRAINS

**Amtrak (National Railroad Passenger Corporation):** Trains arrive at Amtrak's historic 30th Street Station. Call +1-800-272-7245 or go to [www.amtrak.com](http://www.amtrak.com) for information.

**Southeastern Pennsylvania Transportation Authority Regional Rail Lines:** Service to Market East Station, 10th and Market streets, and 16th Street and John F. Kennedy Boulevard. For more information, call +1-215-580-7800 or go to [www.septa.org](http://www.septa.org).

#### BUSES

**New Jersey Transit:** Trailways Terminal, 13th and Arch streets; +1-215-569-3752.

**Greyhound/Trailways:** Trailways Terminal, 10th and Filbert streets; +1-215-931-4014.

#### AIR TRAVEL

Recently rated as one of the best airports in the nation by the *Wall Street Journal*, Philadelphia International Airport (PHL) services 1,300 arrivals and departures daily. The airport is seven miles from Philadelphia Center City. The following airlines have been contracted to provide convention rates to and from Philadelphia for the 2006 GSA Annual Meeting & Exposition. You can save up to 15% on published airfares by booking through the group reservation desks at the numbers listed below.

##### American Airlines

[www.aa.com](http://www.aa.com)

+1-800-433-1790

Group Code: #A19H6AI

American Airlines is offering discounts of 5% off all published round-trip fares. Call +1-800-433-1790 and reference Group Code #A19H6AI.

##### Frontier Airlines

[www.frontierairlines.com](http://www.frontierairlines.com)

+1-800-908-9068

Ticket Designator: #MC004G

Frontier Airlines is offering discounts of 10% off all published round-trip fares. Call +1-800-908-9068 and reference Ticket Designator #MC004G.

##### United Airlines

[www.united.com](http://www.united.com)

+1-800-521-4041

Meeting ID#: 537TH

United is offering a 7% discount off the lowest applicable discount fare if booked more than 30 days prior to arrival and a 2% discount off the lowest applicable discount fare if booked less than 30 days prior to arrival. There is a 10% discount off of fully refundable tickets booked more than 30 days prior to arrival and a 5% discount off of fully refundable tickets booked less than 30 days prior to arrival. First-class and business travelers receive a 15% discount if booked more than 30 days prior to arrival and 10% if booked less than 30 days prior to arrival. Call +1-800-521-4041 and reference Meeting ID #537TH.

### Transportation to and from Philadelphia International Airport

The Southeastern Pennsylvania Transportation Authority Regional Rail Lines (SEPTA) **R1 Airport train** provides service from the airport to Center City every half-hour daily from 6 a.m. to midnight. The line stops at Amtrak's 30th Street Station, Suburban Station (16th Street and John F. Kennedy Boulevard), and at Market East Station (attached to the Pennsylvania Convention Center). Travel time is 23 minutes, and the maximum weekday fare is \$7. For more information, call +1-215-580-7800 or go to [www.septa.org](http://www.septa.org).

#### CAR RENTAL

##### Enterprise Rent-a-Car

1-800-Rent-a-Car; [www.enterprise.com](http://www.enterprise.com)

Group Code: 17C8796

Event Name: CON

You may book reservations online at [www.enterprise.com](http://www.enterprise.com); simply enter your group code, 17C8796, in the optional account box and then press enter, then enter the first three letters of your event name, CON, and press enter. You may also book through Enterprise's National Reservations Center at 1-800-Rent-a-Car. All renters must be at least 21 years of age and have a valid driver's license and credit card in their possession when they pick up their rental vehicle.

#### SHUTTLE SERVICE

##### Lady Liberty Transportation

+1-215-724-8888

Lady Liberty Transportation provides shuttle service for Philadelphia International Airport. Reservations are not necessary. The Lady Liberty van runs 24 hours a day, 7 days a week. You can locate Lady Liberty shuttle vans at the baggage claim area or by dialing #27 on any airport phone. Lady Liberty will also prearrange shuttle service. Return reservations can be made by calling +1-215-724-8888 or by contacting your hotel bell captain.

#### TAXIS

A fleet of 1,400 cabs serves the area. Taxi services can be picked up at Zone 5 on the Commercial Transportation Roadway. Should you need to pay by credit card, please advise the dispatcher upon your arrival to the taxi area because not all cabs or companies accept credit cards or vouchers as a form of payment. Taxi dispatch is available 24 hours a day.

**City Cab:** +1-215-492-6500

**Quaker City Cab:** +1-215-728-8000



## WHEELCHAIR-ACCESSIBLE BUSES, SHUTTLES, TAXIS, OR VANS

All of the buses and trains are wheelchair accessible. The following company will pick you up with prior notice at Philadelphia International Airport and provide specialized transportation. Please make arrangements prior to your arrival.

**ADA Paratransit** +1-215-580-7145

## Transportation Options in Philadelphia

GSA will NOT be providing shuttle service from the hotels to the convention center; however, arrangements for transportation to and from the GSA-designated hotels and the Pennsylvania Convention Center will be provided by GSA for the elderly or disabled. For more information, contact Erin Pitner, [epitner@geosociety.org](mailto:epitner@geosociety.org), +1-303-357-1006.

**Getting around:** Philadelphia Center City is compact, and its grid-like layout makes it very walkable. **SEPTA** operates a large number of bus routes, a subway line, an elevated train, and regional rail lines that provide service throughout the city and into the surrounding countryside. Suburban Station and Market East regional rail stations are in the heart of the business, shopping, and hotel districts. Learn more at [www.septa.org](http://www.septa.org). **The Phlash** trolley service provides quick and easy connections between Center City attractions and most downtown hotels and is just \$1 each time you board. Learn more at [www.phillyplash.org](http://www.phillyplash.org). Finally, catching a **cab** in Center City is easy: just head for the nearest street corner and flag one down.

### Student Travel Grants

Go to [www.geosociety.org/meetings/2006](http://www.geosociety.org/meetings/2006) for information on student travel grants.

## ↔ General Meeting ↔ Information

### ACCESSIBILITY

GSA is committed to making the annual meeting accessible to all people. If you need auxiliary aids or service because of a disability, check the appropriate box on the registration form. For further information, contact Kevin Ricker, [kicker@geosociety.org](mailto:kicker@geosociety.org), +1-303-357-1090. Please let us know your needs by 18 September 2006.

### TOURIST INFORMATION

You can find information about sightseeing, accommodations, restaurants, and shopping in Philadelphia at [www.pcvb.org](http://www.pcvb.org) or [www.geosociety.org/meetings/2006](http://www.geosociety.org/meetings/2006).

### WEATHER

The average high temperature for Philadelphia in October is 66 °F (19 °C), with an average rain fall of 2.75 in. (69.8 mm). This is a four-season town; fall displays the amazing colors of the area's abundant trees.

GSA TODAY, SEPTEMBER 2006

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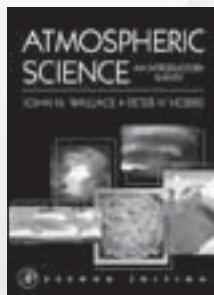
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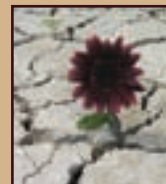
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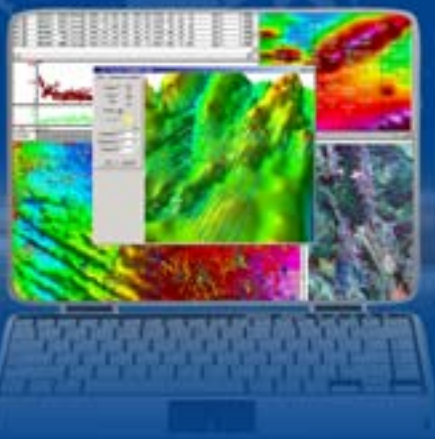
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# GSA MENTOR PROGRAMS

2006 GSA Annual Meeting & Exposition

Philadelphia, Pennsylvania

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## Seeking Employment? Plan to attend the Careers Roundtable Discussions

Sun., 22 Oct. 2006, 10 a.m.–noon

Don't miss this opportunity to talk with geoscience professionals who are willing to share their insight about the job market. These mentors—all offering one-on-one career advice—hail from a broad range of geoscience-related career choices, representing academics, industry, and government agencies. If you are seeking employment, or will be in the future, join this group for networking opportunities and job-market perspectives. This FREE come-and-go event is **open to everyone**; registration is not required. Pennsylvania Convention Center, GSA Employment Services area, room 201A.

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## Attention Students Pursuing a Hydrogeology Career Path!

The Mann Mentors in Applied Hydrogeology Program makes it possible for up to 25 students to attend the distinguished GSA Hydrogeology Division awards presentation luncheon, without cost to the students. Eligible students will have the chance to meet some of the nation's top hydrogeologists and witness the presentation of the Hydrogeology Division's coveted awards. **Eligible students are those who checked the box on their membership application indicating their professional interest in hydrology/hydrogeology and who have registered for the Annual Meeting by 11 September 2006.** FREE tickets will be awarded to the first 25 students who respond to an **e-mail invitation**, based on the eligibility criteria above. Registration required.

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## Students, Check Out the GEOLOGY IN GOVERNMENT Mentor Program!

Mon., 23 Oct. 2006, 11:30 a.m.–1:00 p.m.

Plan to arrive early for this FREE lunch for undergraduate and graduate students to be held at GSA's Philadelphia meeting. This popular annual event will feature a select panel of mentors representing various government agencies. Mentors will invite questions from students, offer advice about preparing for a career, and comment on the prospects for current and future job opportunities with their agencies. **Registration is not required**; every student registered for the annual meeting will receive a ticket to this event along with their badge. Attendance is limited, however, so please arrive early!

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*Times and exact locations will be noted in the annual meeting program.*

**For more information about GSA's Mentor Programs, contact [glewis@geosociety.org](mailto:glewis@geosociety.org).**

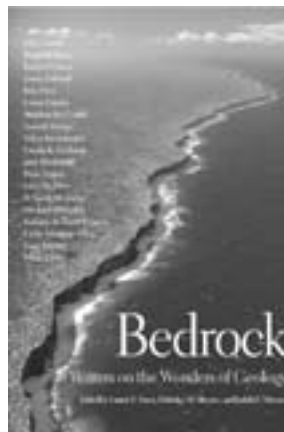


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tectonics, petrology, mantle dynamics, impacts, and syntheses reconciling several branches of earth science. Included are chapters that advocate the plume model and ones that advocate alternative models. The book will enjoy a long lifetime of usefulness and functions as a reference work for students, scholars, and informed lay people. It is equally valuable for supporting advanced undergraduate or post-graduate courses and research scientists working at the forefront of hotspot science. It is an essential addition to the bookshelves of every science library, earth science teacher, and research scientist who aspires to understand the frontiers of this exciting subject. With over 150 color plates, it makes a beautiful addition to the library of anyone fascinated by volcanoes—one of nature's most exciting and extraordinary phenomena.

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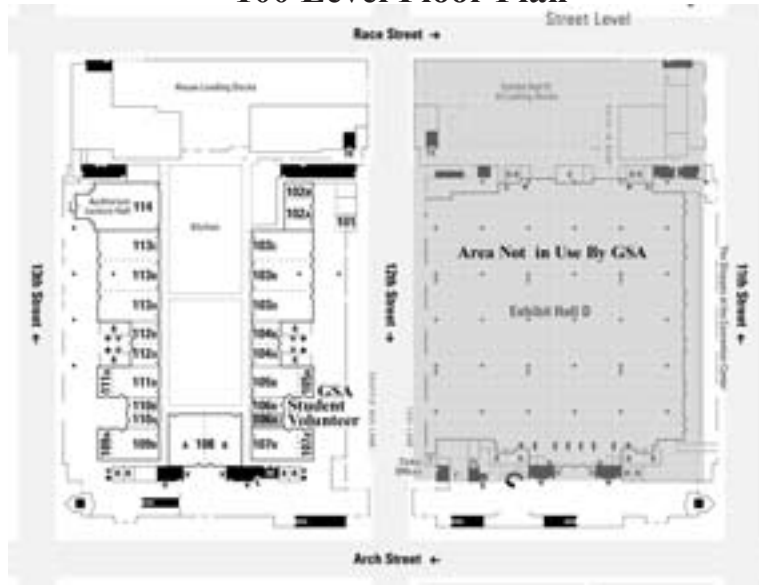


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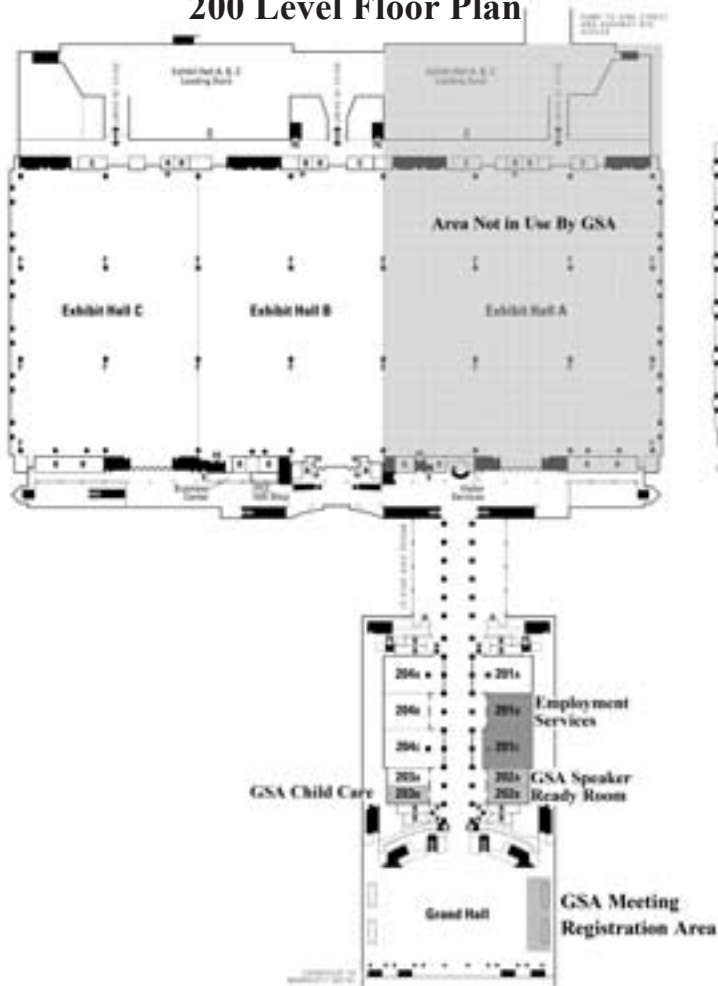
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# → Pennsylvania Convention Center Floorplans ←

## 100 Level Floor Plan



## 200 Level Floor Plan



## 300 Level Floor Plan



## Ballroom Level Floor Plan

## ↔ Loews Floor Plans ↔

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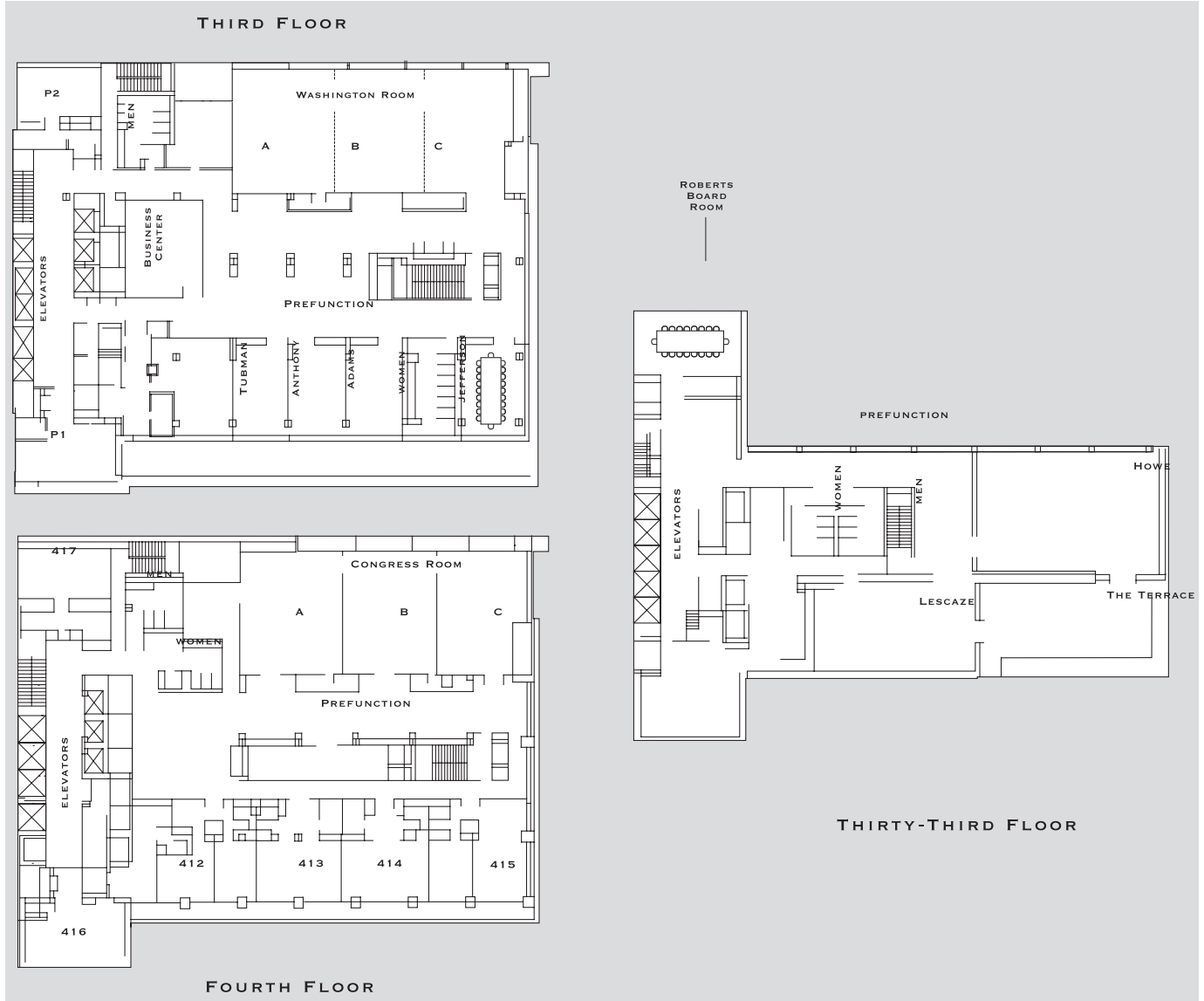
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## ↔ Loews Floor Plans ↔



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## ↔ Hot Topics ↔

Pennsylvania Convention Center, Room 108A

22–25 Oct., 12:15–1:15 p.m.



Be sure to check the on-site program for a listing of the Hot Topics for 2006! Join your colleagues for spirited lunchtime discussions and debates on several burning issues for the professional geologic community. Chili and beer will be available for purchase outside the meeting room.



# GSA Trivia Night

Tues., 24 Oct., 7:30–9:30 p.m.



Test your knowledge of geoscience trivia at this evening of fun. Over 100 questions will have you racking your brain and testing your skills!

Register a team or join a mixed team. Meet new people, share your knowledge, and have a great evening in Philadelphia. Winning teams will be awarded fabulous prizes and the prestige of being GSA Trivia Night winners!



Teams and individuals can register before the event.  
E-mail [glewis@geosociety.org](mailto:glewis@geosociety.org).

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# Unconventional Gas

EIGHTH ANNUAL  
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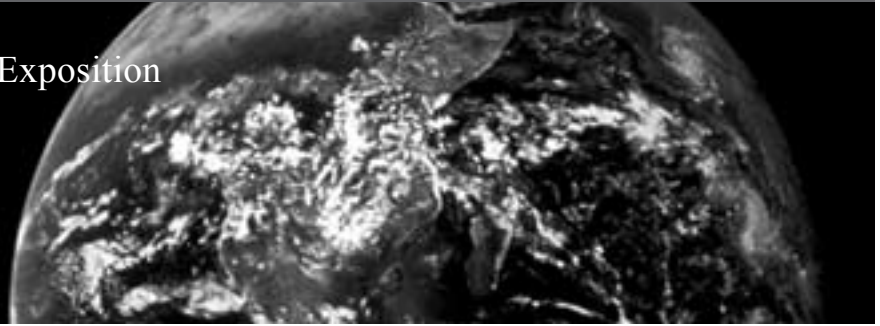
Division of Earth Sciences

## Call for 2007 Field Trip Proposals

2007 GSA Annual Meeting & Exposition

28–31 October 2007

Denver, Colorado, USA



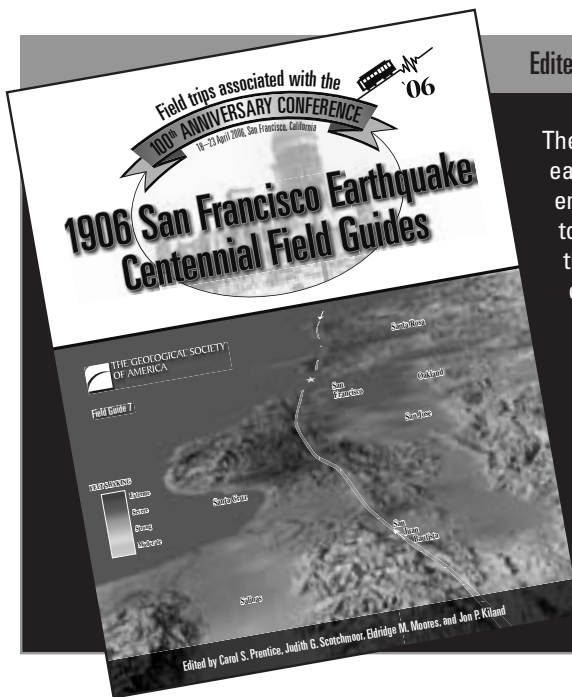
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<http://gsa.confex.com/gsa/2007am/fieldtrip.htm>

Please contact Mollie VanOtterloo, +1-303-357-1060, [mvanotterloo@geosociety.org](mailto:mvanotterloo@geosociety.org), with any questions about the field trip proposal process.

**Due Date for Field Trip Proposals: 5 December 2006**



Edited by Carol S. Prentice, Judith G. Scotchmoor, Eldridge M. Moores, and Jon P. Kiland

The twenty field trip guides in this volume represent the work of earthquake professionals from the earth science, engineering, and emergency management communities. The guides were developed to cross the boundaries between these professions, and thus reflect this diversity: trips herein focus on the built environment, the effects of the 1906 earthquake, the San Andreas fault, and other active faults in northern California. Originally developed in conjunction with the 100th Anniversary Earthquake Conference held in San Francisco, California, in April 2006, this book is meant to stand the test of time and prove useful to a wide audience for general interest reading, group trips, or self-guided tours.

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