

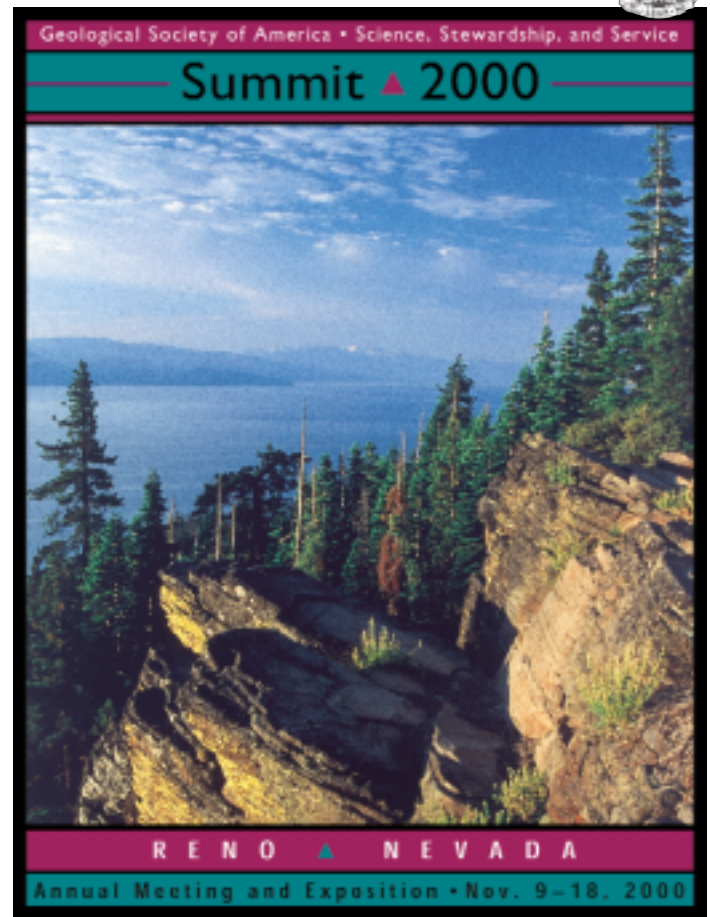


SUMMIT 2000, RENO!

The Geological Society of America 2000 Annual Meeting will be an outstanding meeting, brimming with great science, superb field trips, and excellent entertainment. You can't afford to miss this one! More than 150 topical and Pardee sessions are planned. Field trips will cover much of the Great Basin and parts of the Sierra Nevada, featuring earthquakes, geoarchaeology, hazards, hydrology, neotectonics, ore deposits, paleoclimate, paleontology, plutons, Precambrian rocks, Quaternary climates, stratigraphy, tectonics, and more. Reno is 45 minutes from Lake Tahoe, alpine and Nordic skiing, and historic sites such as Virginia City. Near the meeting site are casinos, museums, theaters, and a dazzling array of fine restaurants and pubs.

Our goals are to:

- ▲ Emphasize the multidisciplinary nature of the chemical, physical, and biological subdisciplines of the earth sciences;
- ▲ Provide a high-visibility forum to communicate both important developments in our traditional disciplines and creative new approaches using promising new technologies;
- ▲ Explore opportunities for earth science research and education via the World Wide Web;
- ▲ Promote the importance of earth science and society, earth science education, and balancing between resource needs and environmental preservation.



GSA PRESIDENTIAL ADDRESS AND AWARDS CEREMONY

New Day and Time: Sunday, November 12, 3:00– 5:00 p.m.

Save 3:00–5:00 p.m. Sunday for GSA President Mary Lou Zoback's address, *Grand Challenges in Earth and Environmental Science—Science, Stewardship, and Service for the 21st Century*, and the 2000 Annual Meeting Awards Ceremony.

Awardees for the Penrose Medal, the Day Medal, the Young Scientist Award (Donath Medal), the Public Service Award, and the

Distinguished Service Award, as well as the newly elected Honorary Fellows, will be announced in the July issue of *GSA Today*.

Hear Mary Lou Zoback's address and honor your fellow geoscientists, the awardees and Honorary Fellows, at the Presidential Address and Awards Ceremony before heading for the Welcoming Party (5:00–7:30 p.m.) in the same building—the Reno/Sparks Convention Center.

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Downtown Reno, Nevada. Photo courtesy of Reno News Bureau.

Welcome to Reno,

a city proud to be the site of the Geological Society of America's Annual Meeting in November 2000

2000 GSA ANNUAL MEETING SPONSORS

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ANNUAL MEETING & EXPOSITION NOVEMBER 9-18 • RENO, NEVADA

Technical Program	November 13-16
Premeeting Field Trips	November 9-12
Short Courses and Workshops	November 11-12
Exhibits Open	November 12-15
Postmeeting Field Trips	November 16-18

2000 GSA ANNUAL MEETING HOSTS

University of Nevada—Reno
Desert Research Institute
Geological Society of Nevada

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ASSOCIATED SOCIETIES

American Association of Stratigraphic Palynologists ♦ American Institute of Professional Geologists ♦ Association for Women Geoscientists ♦ Association of American State Geologists ♦ Association of Earth Science Editors ♦ Association of Engineering Geologists ♦ Association of Geoscientists for International Development ♦ Council on Undergraduate Research—Geology Division ♦ Cushman Foundation ♦ Geochemical Society ♦ Geoscience Information Society ♦ History of the Earth Sciences Society ♦ Mineralogical Society of America ♦ National Association for Black Geologists and Geophysicists ♦ National Association of Geoscience Teachers ♦ National Earth Science Teachers Association ♦ National Ground Water Association ♦ Paleontological Research Institution ♦ Paleontological Society ♦ Sigma Gamma Epsilon ♦ Society for Sedimentary Geology ♦ Society of Economic Geologists ♦ Society of Vertebrate Paleontology

GSA DIVISIONS

The GSA Divisions enhance the Society's technical, scientific, and professional activities. Members are encouraged to participate in all Divisions in which they have an interest. The GSA Divisions are:

Archaeological Geology ♦ Coal Geology ♦ Engineering Geology ♦ Geophysics ♦ Geoscience Education ♦ History of Geology ♦ Hydrogeology ♦ International ♦ Planetary Geology ♦ Quaternary Geology and Geomorphology ♦ Sedimentary Geology ♦ Structural Geology and Tectonics



PARDEE KEYNOTE SYMPOSIA INVITED PAPERS

K1 ▲ Geology in the New Millennium I: Resource Collapse, Environmental Catastrophe, or Technological Fix?

Stephen L. Gillett, Mackay School of Mines, Reno, Nevada. Monday, November 13, 8 a.m.–12 noon.

Is the 21st century headed for catastrophic resource shortages or environmental apocalypse, as has been predicted since the 1970s? Or will new technologies come onstream quickly enough to avert disaster? This session contrasts both views, with presentations both by leaders in various emerging technologies and by those who view resource shortages as imminent. ORAL

K2 ▲ Sedimentary Extremes: Modern and Ancient

GSA Sedimentary Geology Division. Marjorie A. Chan, University of Utah, Salt Lake City; Allen W. Archer, Kansas State University, Manhattan. Wednesday, November 15, 8 a.m.–12 noon.

Can mere humans comprehend the largest depositional phenomena of all geologic time? What are the greatest environmental and/or facies extremes? This innovative session will synthesize and stretch beyond our uniformitarian views to explore the hows and whys of sedimentary events that exceed the present norms by orders of magnitude. ORAL

K3 ▲ Causes and Consequences of Floods: Geologic, Climatologic, Ecologic, and Human Dimensions

GSA Quaternary Geology and Geomorphology Division. Jim E. O'Connor, U.S. Geological Survey, Portland, Oregon; Kyle House, University of Nevada, Reno. Thursday, November 16, 8 a.m.–12 noon.

Practicing earth scientists and educators will gain expanded awareness about the varied research focused on flood processes, including the causes, hazards, and ecologic role of floods, and what part they play in forming the geologic record. Speakers will describe the questions that flood researchers are now asking, the methods being used to answer these questions, and current and emerging ideas regarding floods and their effects. ORAL

K4 ▲ A New Age of Planetary Exploration: Sample Returns, In Situ Geological Analysis, and Human Missions to Other Worlds

GSA Planetary Geology Division. Ralph Harvey, Case Western Reserve University, Cleveland, Ohio; Cassandra Coombs, College of Charleston, Charleston, South Carolina. Monday, November 13, 1:30–5:30 p.m.

Sample return missions, new in-situ geologic tools, and the return of human geologists to alien outcrops promise to revolutionize planetary geology in the coming decades. Presentations by project scientists



Thrust fault, Keystone Thrust, southwestern Nevada. Carbonates over sandstone. Photo by Martin Miller.

will introduce and discuss upcoming or planned planetary missions that exemplify the translation of traditional “hands-on” geology to other worlds, including Mars, the asteroids, comets, the Moon, and the Sun. ORAL

K5 ▲ Great Science in the Great Basin

U.S. Geological Survey, Nevada Bureau of Mines and Geology. Benita L. Murchey, U.S. Geological Survey, Menlo Park, California; Jonathan G. Price, University of Nevada, Reno. Thursday, November 16, 1:30–5:30 p.m.

In this symposium on the current and future trends in earth science in the Great Basin province, speakers will focus on the state of the science and fundamental unanswered questions in three major branches of research: geologic framework and ore genesis, geohydrology, and earth surface processes. Subtext issues will include the increase in interdisciplinary studies and the growing influence of land management issues and public policy on scientific directions. ORAL

K6 ▲ Living with Uncertainty: Scientific, Political, and Societal Perspectives

GSA Institute for Earth Science and the Environment. Christine Turner, U.S. Geological Survey, Denver, Colorado; Robert Frode-man, University of Colorado, Boulder. Tuesday, November 14, 1:30–5:30 p.m.

How does science understand uncertainty? What are society's expectations concerning our ability to provide answers to societal problems? Speakers in this symposium will address: shifting priorities in hazards research; how complexity changes our per-

ceptions of nature; the promises and drawbacks of predictive modeling; public perceptions of uncertainty; and how the USGS Center for Science Policy addresses these issues. ORAL

K7 ▲ Nuclear Waste Disposal: Bridging the Gap Between Science and Policy

GSA Hydrogeology Division. Jane C.S. Long, Mackay School of Mines, Reno, Nevada; Kevin D. Crowley, Board on Radioactive Waste Management, Washington, D.C.; Jean M. Bahr, University of Wisconsin, Madison. Tuesday, November 14, 8 a.m.–12 noon.

What is the scientific process of developing confidence in the long-term performance of a repository, and how does this process relate to the policy-making process? Two panels will examine the science of performance prediction and how scientists can communicate the science and its uncertainties to nonscientists and policymakers. ORAL

K8 ▲ Lamont and Plate Tectonics: History of Geology Division Millennium Symposium: Lamont 1949–1999

GSA History of Geology Division; History of Earth Sciences Society (HESS). Gerald M. Friedman, Northeastern Science Foundation, Inc., Troy, New York. Wednesday, November 15, 1:30–5:30 p.m.

This may be the last opportunity to bring together the surviving founders of the global tectonics theory, which has been called one of the most profound additions to geology. The pioneers will describe how they made their discoveries. ORAL



DISCIPLINE AND TOPICAL SESSIONS

INVITED AND VOLUNTEERED PAPERS

Abstracts Deadline: **July 25** for **paper** submissions; **August 1** for **electronic** submissions.

Please send all invited and volunteered abstracts (electronic and paper) to GSA. Abstracts will be forwarded to the advocates for review. For instructions on how to submit your abstract, see page 26.

Topical Sessions

For a description of each topical session, visit our Web site at www.geosociety.org. The sessions listed below are topically focused and feature a mix of invited and volunteered papers. Sessions are designed to promote the exchange of interdisciplinary, state-of-the-art information. Papers are submitted to a specific session title and a scientific category. Each topical session may have as many as three categories from which authors may choose. After each topical description below, the categories are identified by name and number as they appear on the 2000 Abstract Form. PLEASE SUBMIT ONLY IN THE MODE (oral or poster) AND CATEGORIES INDICATED in the description. An abstract submitted in the incorrect mode will be transferred automatically to a discipline session.

ROLE OF SESSION ADVOCATE: An advocate has proposed each topical session. Advocates may invite specific papers to ensure a successful and excellent session. Volunteered abstracts are also solicited for all approved topical sessions unless otherwise indicated. GSA Joint Technical Program Committee representatives, in consultation with the advocates, will organize topical sessions by mid-August.

Don't see a Topical Session into which your abstract would fit? Abstract submissions are not limited to the topical sessions listed below. If you choose one of the discipline categories listed on the abstract form and not a topical session, your abstract will be placed in a session along with other "like" abstracts. Here is a listing of the discipline sessions GSA offers:

Archaeological Geology
Coal Geology
Economic Geology
Engineering Geology
Environmental Geoscience
Geochemistry—Aqueous, Organic, Other
Geology Education
Geomicrobiology
Geophysics/Tectonophysics/Seismology
Geoscience Information
History of Geology
Hydrogeology
Marine/Coastal Science
Micropaleontology
Mineralogy/Crystallography
Neotectonics/Paleoseismology

Paleoclimatology/Paleoceanography
Paleontology/Paleobotany
Petrology—Experimental, Igneous, Metamorphic
Planetary Geology
Precambrian Geology
Public Policy
Quaternary Geology/Geomorphology
Remote Sensing/Geographic Information Systems
Sediments—Carbonates, Clastic
Stratigraphy
Structural Geology
Tectonics
Volcanology

Discipline Sessions

Papers are submitted for consideration in a scientific discipline. Joint Technical Program Committee (JTPC) representatives organize the papers in sessions focused on this discipline—for example, environmental geoscience or mineralogy.

ENERGY TOPICAL SESSIONS

T1 ▲ Geology in the New Millennium II: Resource Collapse, Environmental Catastrophe, or Technological Fix?

Stephen L. Gillett, Mackay School of Mines, Reno, Nevada. ORAL

Public Policy [26], Economic Geology [3], Non-geoscience [35]

T2 ▲ Frontiers in Gas Hydrate Research

Geochemical Society. Miriam Kastner, Scripps Institution of Oceanography, La Jolla, California; Charles Paull, Moss Landing Marine Laboratories, Moss Landing, California. ORAL

Marine/Coastal Science [15], Geochemistry Other [8], Paleoclimatology/Paleoceanography [19]

T3 ▲ Environmental Aspects of Fossil Fuel Use

GSA Coal Geology Division; U.S. Geological Survey. Leslie F. Ruppert, Ronald W. Stanton, U.S. Geological Survey, Reston, Virginia. ORAL

Coal Geology [2], Environmental Geoscience [5], Public Policy [26]

PLANETARY TOPICAL SESSIONS

T4 ▲ Structure and Tectonics of Planets and Satellites

GSA Planetary Geology Division. Richard A. Schultz, University of Nevada, Reno. ORAL

Planetary Geology [24], Tectonics [33], Structural Geology [32]

T5 ▲ Reaching Beyond Earth: Innovative Plans and Novel Technologies for the New Age of Planetary Exploration

GSA Planetary Geology Division; NASA Office of Space Sciences. James Zimbelman, National Air and Space Museum, Washington, D.C.; Ralph Harvey, Case Western Reserve University, Cleveland, Ohio; Cassandra Coombs, College of Charleston, Charleston, South Carolina. POSTER

Planetary Geology [24], Geochemistry Other [8], Geology Education [9]

T6 ▲ Impact Crater Excavation, Modification, and Ejecta Distribution Mechanisms

GSA Planetary Geology Division. John G. Spray, University of New Brunswick, Fredericton. ORAL

Planetary Geology [24], Tectonics [33], Petrology, Igneous [22]

T7 ▲ Weathering Processes: The Message in Martian Meteorites

GSA Planetary Geology Division. Mary Sue Bell, NASA/Johnson Space Center, Houston, Texas; Michael A. Velbel, Michigan State University, East Lansing. ORAL

Planetary Geology [24], Geochemistry Aqueous [6], Geomicrobiology [10]

GEOPHYSICS, STRUCTURE, TECTONICS, AND STRATIGRAPHY TOPICAL SESSIONS

T8 ▲ Integrated Studies of Active Western North America Tectonics

American Geophysical Union. Richard A. Bennett, Harvard-Smithsonian Center for Astrophysics, Cambridge, Massachusetts; Anke Friedrich, California Institute of Technology, Pasadena. ORAL

Geophysics/Tectonophysics/Seismology [11], Neotectonics/Paleoseismology [18], Tectonics [33]

T9 ▲ Kinematics vs. Mechanics: Are Only One or Both Useful Rationales for Understanding Rock Deformation?

GSA Structural Geology and Tectonics Division. William M. Dunne, University of Tennessee, Knoxville. ORAL

Structural Geology [32], Tectonics [33], Geophysics/Tectonophysics/Seismology [11]

T10 ▲ The Colorado Plateau: Its Origin, Boundaries, Lithospheric Structure, and Evolution

GSA Geophysics Division. Randy Keller, University of Texas, El Paso; Anne Sheehan, University of Colorado, Boulder. ORAL

Geophysics/Tectonophysics/Seismology [11], Tectonics [33], Structural Geology [32]



T11 ▲ Neotectonic Microplates of the Pacific-North America Boundary

GSA Structural Geology and Tectonics Division. Francis C. Monastero, Naval Air Weapons Station, China Lake, California; Allen F. Glazner, University of North Carolina, Chapel Hill; Douglas Walker, University of Kansas, Lawrence. ORAL and POSTER sessions

Tectonics [33], Structural Geology [32], Geophysics/Tectonophysics/Seismology [11]

T12 ▲ Superplume Events in Earth History: Causes and Effects

GSA International Division. Kent C. Condie, New Mexico Tech, Socorro; Dallas Abbott, Columbia University, Palisades, New York; David J. Des Marais, Ames Research Center, Moffett Field, California. ORAL

Geophysics/Tectonophysics/Seismology [11], Precambrian Geology [25], Geochemistry Other [8]

T13 ▲ Recent Advances in Our Understanding of Flat Slab Subduction: A Comparison Between Modern and Ancient Subduction Settings in the Americas

GSA Structural Geology and Tectonics Division; American Geophysical Union. Brendan A. McNulty, California State University, Dominguez Hills, Carson; Daniel L. Farber, Lawrence Livermore National Laboratory, Livermore, California. ORAL

Tectonics [33], Geophysics/Tectonophysics/Seismology [11], Structural Geology [32]

T14 ▲ Geophysical and Tectonic Signatures of Triple Junction Migration: Mendocino and Others

GSA Geophysics Division. Kevin P. Furlong, Pennsylvania State University, University Park. ORAL

Geophysics/Tectonophysics/Seismology [11], Tectonics [33], Quaternary Geology/Geomorphology [27]

T15 ▲ Cenozoic Basin and Range Tectonics and Geophysical Constraints

GSA Geophysics Division; Nevada Seismological Laboratory, University of Nevada, Reno. John N. Louie; John G. Anderson; Geoff Blewitt, University of Nevada, Reno. ORAL

Tectonics [33], Geophysics/Tectonophysics/Seismology [11], Neotectonics/Paleoseismology [18]

T16 ▲ Deep Structure of Archean Cratons

GSA Geophysics Division; GSA International Division. Andrew A. Nyblade, Pennsylvania State University, University Park; Richard W. Carlson, Carnegie Institution of Washington, Washington, D.C. ORAL

Geophysics/Tectonophysics/Seismology [11], Geochemistry Other [8], Precambrian Geology [25]

T17 ▲ Evolution of the Lake Tahoe Basin: Geologic Framework, Neotectonics, Seismology, Geophysics, Geomorphology, Hydrology, and Environment

GSA Structural Geology and Tectonics Division. Mary M. Lahren; Richard A. Schweickert, University of Nevada, Reno. ORAL

Neotectonics/Paleoseismology [18], Geophysics/Tectonophysics/Seismology [11], Environmental Geoscience [5]

T18 ▲ Earthscope—A Look into Our Continent: Opportunities for Interdisciplinary Research in Geophysics and Geology

GSA Geophysics Division; Nevada Seismological Laboratory. John G. Anderson, University of Nevada, Reno. ORAL

Geophysics/Tectonophysics/Seismology [11], Tectonics [33], Neotectonics/Paleoseismology [18]

T19 ▲ The Walker Lane: An Evolving Transform Plate Boundary

GSA Structural Geology and Tectonics Division. James E. Faulds, University of Nevada, Reno; John S. Oldow, University of Idaho, Moscow; Wayne R. Thatcher, U.S. Geological Survey, Menlo Park, California. ORAL and POSTER sessions

Tectonics [33], Structural Geology [32], Geophysics/Tectonophysics/Seismology [11]

T20 ▲ Reconstructing Miocene and Younger Extension Across the Northern Basin and Range Province

GSA Structural Geology and Tectonics Division. Elizabeth L. Miller; Trevor A. Dumitru, Stanford University, Stanford, California. ORAL and POSTER sessions

Structural Geology [32], Geophysics/Tectonophysics/Seismology [11], Sediments, Clastic [30]

T21 ▲ New Developments in the Mesozoic Tectonic Evolution of the North American Cordillera

GSA Structural Geology and Tectonics Division. Sandra J. Wyld, University of Georgia, Athens; William McClelland, University of Idaho, Moscow; James E. Wright, Rice University, Houston, Texas. ORAL and POSTER sessions

Tectonics [33], Structural Geology [32], Geophysics/Tectonophysics/Seismology [11]

T22 ▲ The Late Paleozoic Tectonics of Central and Western North America—The Ancestral Rocky Mountains: Insights into Intraplate Deformation

GSA Structural Geology and Tectonics Division; Friends of the Ancestral Rocky Mountains. Charles F. Kluth, Chevron, San Ramon, California; Gerilyn S. Soreghan, University of Oklahoma, Norman. ORAL and POSTER sessions

Tectonics [33], Structural Geology [32], Stratigraphy [31]

T23 ▲ The Antler Foreland Basin System

Katherine A. Giles, New Mexico State University, Las Cruces. ORAL

Tectonics [33], Stratigraphy [31], Geochemistry Other [8]

T24 ▲ Proterozoic Tectonic Evolution of Western Laurentia: Continental Accretion to Breakup of Rodinia

GSA Structural Geology and Tectonics Division. Karl E. Karlstrom, University of New Mexico, Albuquerque. ORAL

Tectonics [33], Precambrian Geology [25], Structural Geology [32]

T25 ▲ Rates of Magmatic and Host-Rock Processes in Arcs

GSA Structural Geology and Tectonics Division. Robert B. Miller, San Jose State University, San Jose, California; Scott R. Paterson, University of Southern California, Los Angeles; Samuel A. Bowring, Massachusetts Institute of Technology, Cambridge. ORAL and POSTER sessions

Structural Geology [32], Petrology, Igneous [22], Geochemistry Other [8]

T26 ▲ Paleomagnetic Applications to Geologic Problems

American Geophysical Union. Richard D. Elmore; Michael T. Lewchuk, University of Oklahoma, Norman. ORAL

Tectonics [33], Sediments, Carbonates [29], Geochemistry Other [8]

T27 ▲ Evolution of the East African and Related Orogens, and the Assembly of Gondwana

GSA Structural Geology and Tectonics Division; GSA International Division. Timothy M. Kusky, Boston University, Boston, Massachusetts; Robert D. Tucker, Washington University, St. Louis, Missouri; Robert J. Stern, University of Texas at Dallas, Richardson. ORAL

Tectonics [33], Precambrian Geology [25], Paleontology/Paleobotany [20]

T28 ▲ Mexico: Four Centuries of Geological Exploration

GSA International Division. Claudio Bartolini, Plano, Texas; Harold Lang, Jet Propulsion Laboratory, Pasadena, California; Enrique Cabral Cano, Universidad Nacional Autónoma de México, Mexico. D.F. ORAL

Tectonics [33], Stratigraphy [31], Structural Geology [32]

T29 ▲ Xenolith-Based Studies of the Physical and Chemical Evolution of the Deep North American Lithosphere

G. Lang Farmer, University of Colorado, Boulder; Michael L. Williams, University of Massachusetts, Amherst. ORAL

Tectonics [33], Petrology, Igneous [22], Geochemistry Other [8]

**T30 ▲ Lake Basins as Archives of Continental Tectonics and Climate**

GSA Sedimentary Geology Division. Alan R. Carroll, University of Wisconsin, Madison; Paul Buchheim, Loma Linda University, Loma Linda, California. ORAL

Stratigraphy [31], Sediments, Carbonates [29], Sediments, Clastic [30]

T31 ▲ 3-D Seismic Interpretation: Seismic Stratigraphy and Volume Interpretation

GSA Sedimentary Geology Division; Society for Sedimentary Geology (SEPM). Steve May; Art Donovan, ExxonMobil Upstream Research, Houston, Texas. ORAL

Stratigraphy [31], Geophysics/Tectonophysics/Seismology [11], Sediments, Clastic [30]

T32 ▲ Global Stratotype Section and Point (GSSP) for Middle Ordovician Series: Biostratigraphy and Candidate Sections

Subcommission on Ordovician Stratigraphy, International Commission on Stratigraphy (IUGS); GSA International Division. Stan Finney, California State University, Long Beach; Ray Ethington, University of Missouri, Columbia. ORAL

Stratigraphy [31], Paleontology/Paleobotany [20], Sediments, Carbonates [29]

T33 ▲ Carbonate Allostratigraphy and Sequence Stratigraphy

North American Commission on Stratigraphic Nomenclature. Ernest A. Mancini; William C. Parcell; Marcello Badali, University of Alabama, Tuscaloosa. POSTER

Stratigraphy [31], Sediments, Carbonates [29], Paleontology/Paleobotany [20]

ECONOMIC GEOLOGY, MINERALOGY, VOLCANOLOGY, AND PETROLOGY TOPICAL SESSIONS**T34 ▲ Gold Deposits of the Great Basin**

Society of Economic Geologists. Tommy B. Thompson, University of Nevada, Reno; Odin Christensen, Newmont Mining Company, Englewood, Colorado; Keith Bettles, Barrick Goldstrike Mines, Elko, Nevada. ORAL

Economic Geology [3], Geochemistry Other [8], Mineralogy/Crystallography [17]

T35 ▲ Deep Crustal Controls on Mineral Trends—Evidence from the Subsurface

Society of Economic Geologists. V.J.S. (Tien) Grauch, U.S. Geological Survey, Denver, Colorado; A. Elizabeth Jones, GeoLogic Services, Reno, Nevada. ORAL

Economic Geology [3], Geophysics/Tectonophysics/Seismology [11], Tectonics [33]

T37 ▲ Sulfate Minerals I. Hydrothermal Systems (A Tribute to Robert O. Rye)

Mineralogical Society of America; Society of Economic Geologists; Geochemical Society. Charlie Alpers, U.S. Geological Survey, Sacramento, California; Kirk Nordstrom, U.S. Geological Survey, Boulder, Colorado. ORAL and POSTER sessions

Mineralogy/Crystallography [17], Geochemistry Other [8], Economic Geology [3]

T38 ▲ Sulfate Minerals II. Low-Temperature Environments

Mineralogical Society of America; Geochemical Society; Society of Economic Geologists. Kirk Nordstrom, U.S. Geological Survey, Boulder, Colorado; Charlie Alpers, U.S. Geological Survey, Sacramento, California; John Jambor, Tsawwassen, British Columbia. ORAL and POSTER sessions

Mineralogy/Crystallography [17], Geochemistry Other [8], Environmental Geoscience [5]

T39 ▲ Mineralogy of the Mixed-Layer Clays with Applications for Understanding Earth Processes and History, a Session to Honor Robert C. Reynolds, Jr., the Year 2000 Winner of the Roebling Award

Mineralogical Society of America. James Aronson, Dartmouth College, Hanover, New Hampshire. ORAL

Mineralogy/Crystallography [17], Sediments, Clastic [30], Geochemistry Other [8]

T40 ▲ Interpreting the Morphology of Mafic and Ultramafic Lava Flows

Laszlo Keszthelyi, University of Arizona, Tucson; Stephen Self, University of Hawaii at Manoa, Honolulu; Thorvaldur Thordarson, Commonwealth Scientific and Industrial Research Organisation (CSIRO), Wembley, Australia. ORAL

Volcanology [34], Petrology, Igneous [22], Planetary Geology [24]

T41 ▲ Recent Results on the Causes and Consequences of Oceanic Island Volcanism: Where Are We Going Next?

International Association of Volcanology and Chemistry of the Earth's Interior; GSA International Division. Michael O. Garcia, University of Hawaii, Honolulu; Dennis Geist, University of Idaho, Moscow. COMBINED ORAL and POSTER SESSION

Volcanology [34], Petrology, Igneous [22], Geophysics/Tectonophysics/Seismology [11]

T42 ▲ Eruption or Intrusion? Volatiles, Magmas, and Porphyry Copper Deposits

American Geophysical Union. Katharine V. Cashman; Mark Reed, University of Oregon, Eugene; John Dilles, Oregon State University, Corvallis. ORAL

Volcanology [34], Economic Geology [3], Petrology, Igneous [22]

T43 ▲ Magmatism in Mojavia: Geology, Geochemistry, and Correlation

James P. Calzia, U.S. Geological Survey, Menlo Park, California. ORAL

Petrology, Igneous [22], Tectonics [33], Precambrian Geology [25]

T44 ▲ Granite Revisited: Anomalies, Problems, and Novel Approaches

Frank W. Dickson, Mackay School of Mines, Reno, Nevada. ORAL

Petrology, Igneous [22], Geophysics/Tectonophysics/Seismology [11], Geochemistry Other [8]

T45 ▲ Metamorphic Petrology from Experiments to the Field: A Session Honoring M.J. Holdaway

Mineralogical Society of America. Barbara L. Dutrow, Louisiana State University, Baton Rouge. ORAL

Petrology, Metamorphic [23], Petrology, Experimental [21], Mineralogy/Crystallography [17]

QUATERNARY GEOLOGY AND GEOMORPHOLOGY, SEDIMENTOLOGY TOPICAL SESSIONS**T46 ▲ Advances in Quaternary Geochronometry**

GSA Quaternary Geology and Geomorphology Division; American Geophysical Union. Glenn W. Berger, Desert Research Institute, Reno, Nevada; Timothy Jull, University of Arizona, Tucson; John Stone, University of Washington, Seattle. ORAL

Quaternary Geology/Geomorphology [27], Geochemistry Other [8], Paleoclimatology/Paleoceanography [19]

T47 ▲ The Interaction between Soil and Biologic Processes in Landscape and Ecosystem Dynamics

GSA Quaternary Geology and Geomorphology Division. Alan J. Busacca, Washington State University, Pullman; Eric V. McDonald, Desert Research Institute, Reno, Nevada. ORAL

Quaternary Geology/Geomorphology [27], Environmental Geoscience [5], Paleontology/Paleobotany [20]



T48 ▲ Causes and Consequences of Floods: Geologic, Climatologic, Ecologic, and Human Dimensions

GSA Quaternary Geology and Geomorphology Division. Jim E. O'Connor, U.S. Geological Survey, Portland, Oregon; Kyle House, University of Nevada, Reno. POSTER

Quaternary Geology/Geomorphology [27], Environmental Geoscience [5], Public Policy [26]

T49 ▲ Ice-Dammed Lake Floods and Subglacial Lake Outbursts; Mechanism, Causes, and Consequences

Amir Mokhtari Fard, University of Manitoba, Winnipeg; Andrew J. Russell, Keele University, Keele, UK. ORAL

Quaternary Geology/Geomorphology [27], Paleoclimatology/Paleoceanography [19], Sediments, Clastic [30]

T50 ▲ Glacial Erosion at the Scales of Individual Alpine Glaciers, Mountain Ranges, and Continental Ice Sheets: Current Understanding and Future Directions

GSA Quaternary Geology and Geomorphology Division. Andrew J. Meigs, Oregon State University, Corvallis; Robert S. Anderson, University of California, Santa Cruz. ORAL and POSTER sessions

Quaternary Geology/Geomorphology [27], Tectonics [33], Sediments, Clastic [30]

T51 ▲ Reshaping Glacial Geomorphology: New Age Controls on Late Pleistocene Alpine Glaciation

GSA Quaternary Geology and Geomorphology Division. Douglas H. Clark, Western Washington University, Bellingham; Paul Bierman, University of Vermont, Burlington; Alan R. Gillespie, Desert Research Institute, Reno, Nevada. ORAL

Quaternary Geology/Geomorphology [27], Paleoclimatology/Paleoceanography [19], Geochemistry Other [8]

T52 ▲ Alpine and Subalpine Glacial and Fluvial Events Following the Last Glacial Maximum in the Mid-Latitude Mountains of the Western U.S.

GSA Quaternary Geology and Geomorphology Division. Eric C. Carson; Jeffrey S. Munroe, University of Wisconsin, Madison. ORAL

Quaternary Geology/Geomorphology [27], Paleoclimatology/Paleoceanography [19], Environmental Geoscience [5]

T53 ▲ The Physical Geology and Geomorphology of Large Lakes: Relationships to Climate and Paleoclimate

GSA Quaternary Geology and Geomorphology Division. Paul W. Jewell; Marjorie A. Chan; Donald R. Currey, University of Utah, Salt Lake City. ORAL

Quaternary Geology/Geomorphology [27], Paleoclimatology/Paleoceanography [19], Environmental Geoscience [5]

T54 ▲ Big Storms of the Past: Evidence and Importance of Paleostorms in the Geologic Record

GSA Quaternary Geology and Geomorphology Division. Karen L. Jennings; Anders J. Noren, University of Vermont, Burlington. ORAL

Quaternary Geology/Geomorphology [27], Paleoclimatology/Paleoceanography [19], Environmental Geoscience [5]

T55 ▲ Geomorphic and Geologic Controls on Surficial and Groundwater Hydrology in Deep Alluvial Basins

GSA Quaternary Geology and Geomorphology Division. David J. Donovan; Joseph F. Leising, Southern Nevada Water Authority, Las Vegas. ORAL

Quaternary Geology/Geomorphology [27], Hydrogeology [14], Stratigraphy [31]

T56 ▲ Ancient Dust: Documentation and Significance of Eolian Silt in the Pre-Cenozoic Record

GSA Sedimentary Geology Division. Gerilyn S. Soreghan, University of Oklahoma, Norman; Russell F. Dubiel, U.S. Geological Survey, Denver, Colorado. ORAL

Sediments, Clastic [30], Paleoclimatology/Paleoceanography [19], Stratigraphy [31]

T57 ▲ Advances in Determining Desert Piedmont Processes and Histories

GSA Quaternary Geology and Geomorphology Division. Kyle K. Nichols, University of Vermont, Burlington; Russell S. Harmon, U.S. Army Research Office, Research Triangle Park, North Carolina; Paul R. Bierman, University of Vermont, Burlington. ORAL

Quaternary Geology/Geomorphology [27], Remote Sensing/Geographic Info System [28], Environmental Geoscience [5]

T58 ▲ Colluvium: Recent Advances in Applying Geomorphology, Stratigraphy, and Sedimentology to Interpret Late Cenozoic Slope Processes

GSA Quaternary Geology and Geomorphology Division; GSA Archaeological Geology Division. J. Steven Kite, West Virginia University, Morgantown; David L. Cremeens, GAI Consultants, Monroeville, Pennsylvania. ORAL

Quaternary Geology/Geomorphology [27], Archaeological Geology [1], Sediments, Clastic [30]

T59 ▲ Vegetation Response to Late Quaternary Climate Variability and Disturbance Regimes in the Pacific Western United States

GSA Quaternary Geology and Geomorphology Division. Wallace B. Woolfenden, U.S. Department of Agriculture Forest Service, Swall Meadows, California. ORAL

Quaternary Geology/Geomorphology [27], Paleontology/Paleobotany [20], Paleoclimatology/Paleoceanography [19]



Granitic boulders, California–Nevada border. Photo by Martin Miller.

T60 ▲ Numerical 3-D Modeling and Reconstruction of Sedimentary Bodies and Structures

GSA Sedimentary Geology Division; SEPM (Society for Sedimentary Geology). Michael P. Suess, Universität Tübingen, Tübingen, Germany. ORAL

Sediments, Clastic [30], Remote Sensing/Geographic Info System [28], Economic Geology [3]

T62 ▲ Stochastic and Deterministic Origins of Surface Processes and Landforms

American Geophysical Union. Lee E. Benda; Daniel J. Miller, Earth Systems Institute, Seattle, Washington; Thomas Dunne, University of California, Santa Barbara. ORAL

Quaternary Geology/Geomorphology [27], Environmental Geoscience [5], Hydrogeology [14]

T63 ▲ Geology and Geophysics of the Lower Mississippi Valley: In Memory of Roger Saucier

GSA Quaternary Geology and Geomorphology Division. Juan M. Lorenzo, Louisiana State University, Baton Rouge; Whitney J. Autin, SUNY, College at Brockport, New York. ORAL

Quaternary Geology/Geomorphology [27], Neotectonics/Paleoseismology [18], Geophysics/Tectonophysics/Seismology [11]



T64 ▲ The Legacy of G.M. Richmond: 50+ years of Quaternary Geology in the Western U.S.

GSA Quaternary Geology and Geomorphology Division. Dennis Dahms, University of Northern Iowa, Cedar Falls; Vance T. Holliday, University of Wisconsin, Madison; Peter W. Birkeland, University of Colorado, Boulder. ORAL

Quaternary Geology/Geomorphology [27], Stratigraphy [31], History of Geology [13]

T152 ▲ Paleoclimatology and Climatology of South America

GSA Quaternary Geology and Geomorphology Division. Paul A. Baker, Duke University, Durham, North Carolina; Catherine A. Rigsby, East Carolina University, Greenville, North Carolina. ORAL

Paleoclimatology/Paleoceanography [19], Archaeological Geology [1], Environmental Geoscience [5]

ENGINEERING AND ENVIRONMENTAL GEOLOGY TOPICAL SESSIONS

T61 ▲ Communicating Geohazards Information Effectively

GSA Engineering Geology Division; GSA Quaternary Geology and Geomorphology Division. Thomas C. Pierson, Cascades Volcano Observatory, Vancouver, Washington; Scott F. Burns, Portland State University, Portland, Oregon. ORAL

Engineering Geology [4], Quaternary Geology/Geomorphology [27], Geoscience Information [12]

T65 ▲ Landslides: From the Summits to the Plains

GSA Engineering Geology Division; GSA Quaternary Geology and Geomorphology Division. Duane A. Eversoll, University of Nebraska, Lincoln; Robert A. Larson, Department of Public Works, Los Angeles County, Van Nuys, California; Scott F. Burns, Portland State University, Portland, Oregon. ORAL

Engineering Geology [4], Environmental Geoscience [5], Quaternary Geology/Geomorphology [27]

T66 ▲ Landslide Risk Mapping and Database

GSA Engineering Geology Division. Hiromitsu Yamagishi, Niigata University, Niigata, Japan. ORAL

Engineering Geology [4], Environmental Geoscience [5], Quaternary Geology/Geomorphology [27]

T67 ▲ Land Subsidence, Earth Fissures, and Aquifer Mechanics

GSA Engineering Geology Division; Morgan State University. Jiang Li, Morgan State University, Baltimore, Maryland; Zhuping Sheng, Public Service Board, El Paso, Texas; Donald C. Helm, Morgan State University, Baltimore, Maryland. ORAL

Engineering Geology [4], Hydrogeology [14], Environmental Geoscience [5]

T68 ▲ Joints and Other Discontinuities

GSA Engineering Geology Division; American Rock Mechanics Association. Judy Ehlen, Topographic Engineering Center, Alexandria, Virginia; Robert D. Jacobi, SUNY, College at Buffalo, Buffalo, New York; Ken Hardcastle, Emery & Garrett Groundwater Inc., Meredith, New Hampshire. ORAL

Engineering Geology [4], Structural Geology [32], Hydrogeology [14]

T69 ▲ Analysis of Active and Potentially Active Faults: Challenges and Case Histories

GSA Engineering Geology Division. Vincent S. Cronin; Keith A. Sverdrup, University of Wisconsin, Milwaukee. ORAL

Engineering Geology [4], Structural Geology [32], Public Policy [26]

T70 ▲ High-Technology Tools for Geologic Research and Practice

GSA Engineering Geology Division. John H. Kramer, Condor Earth Tech, Inc., Sonoma, California. POSTER

Engineering Geology [4], Environmental Geoscience [5], Geology Education [9]

T71 ▲ Regulatory Review: Using Science in the Public's Interest

GSA Engineering Geology Division. Greg K. Johnson, Department of Public Works, Moreno Valley, California; Robert A. Larson, Department of Public Works, Alhambra, California. ORAL

Engineering Geology [4], Environmental Geoscience [5], Public Policy [26]

T72 ▲ Academic Training of Engineering Geologists

GSA Engineering Geology Division; GSA Geoscience Education Division. Terry R. West, Purdue University, West Lafayette, Indiana. ORAL

Engineering Geology [4], Geology Education [9], Public Policy [26]

T73 ▲ Environmental Risk Assessments: Do They Benefit or Endanger the Public?

GSA Engineering Geology Division. Allen W. Hatheway, University of Missouri, Rolla; Robert A. Larson, Department of Public Works, Los Angeles County, Van Nuys, California. ORAL

Engineering Geology [4], Environmental Geoscience [5], Public Policy [26]

T74 ▲ Environmental Restoration of Abandoned Mine Lands

GSA Engineering Geology Division. Syed E. Hasan, University of Missouri, Kansas City. ORAL

Engineering Geology [4], Environmental Geoscience [5], Hydrogeology [14]

T75 ▲ Engineering Geology in the 19th Century

GSA Engineering Geology Division; GSA History of Geology Division. Stephen M. Testa, Testa Environmental Corporation, Mokelumne Hill, California. ORAL

Engineering Geology [4], History of Geology [13], Economic Geology [3]

T76 ▲ Seismic Hazard Analysis: From State of the Art to Standard Practice

GSA Engineering Geology Division. James E. Slosson, Slosson and Associates, Van Nuys, California; Robert A. Larson, Department of Public Works, Van Nuys, California. ORAL

Engineering Geology [4], Geophysics/Tectonophysics/Seismology [11], Public Policy [26]

T129 ▲ Remote Sensing and GIS in the New Millennium: The Use of Remote Sensing and Geographic Information Systems in Surface Water, Groundwater, Soils, and Resource Issues

GSA Engineering Geology Division; GSA Hydrogeology Division. Norman S. Levine; Robert K. Vincent, Bowling Green State University, Bowling Green, Ohio. ORAL

Environmental Geoscience [5], Engineering Geology [4], Hydrogeology [14]

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T130 ▲ Remote Sensing and GIS in the New Millennium: The Use of RS and GIS in Environmental and Engineering Projects: Case Studies in Evaluation, Remediation, Monitoring, and Modeling

GSA Engineering Geology Division; GSA Hydrogeology Division. Norman S. Levine; Robert K. Vincent, Bowling Green State University, Bowling Green, Ohio. ORAL

Environmental Geoscience [5], Engineering Geology [4], Hydrogeology [14]

HYDROGEOLOGY AND GEOCHEMISTRY TOPICAL SESSIONS

T77 ▲ Organic Geochemistry Division Symposium: Sources, Synthesis, Transformations, and Sinks of Organic Matter on Earliest Earth

Geochemical Society Organic Geochemistry Division. Michael H. Engel, University of Oklahoma, Norman; Peggy H. Ostrom, Michigan State University, East Lansing; Stephen A. Macko, University of Virginia, Charlottesville. ORAL

Geochemistry Organic [7], Geomicrobiology [10], Planetary Geology [24]

T78 ▲ International and Cross-Border Issues Related to Groundwater Management Problems, Conflicts and Strategies

GSA Hydrogeology Division; GSA International Division. David L. Rudolph, University of Waterloo, Waterloo, Ontario. ORAL

Hydrogeology [14], Environmental Geoscience [5], Public Policy [26]

T79 ▲ Application of Hydrologic and Geologic Studies to the Performance of a Potential Geologic Repository at Yucca Mountain, Nevada

U.S. Department of Energy. Russell L. Patterson; Robert Levich, Yucca Mountain Site Characterization Office, Las Vegas, Nevada; Ronald Linden, Golder Associates, Inc., Las Vegas, Nevada. ORAL

Hydrogeology [14], Quaternary Geology/Geomorphology [27], Tectonics [33]

T80 ▲ The 2nd GSA International Internet Symposium: Modern Geology in an Ancient Land

University of Texas at Austin; WebEx.com. Thomas R. Fenstemaker; Todd Halihan, University of Texas, Austin; Mohamed F. Hussein, Cairo University, Cairo, Egypt. ORAL

Hydrogeology [14], Archaeological Geology [1], Tectonics [33]

T81 ▲ Geosciences: The Dominant Force in Ensuring Correct Environmental Characterization and Remediation with the Integration of Technologies and Disciplines

Argonne National Laboratory. Jacqueline C. Burton, Argonne National Laboratory, Argonne, Illinois; Kenneth E. Kolm, Colorado School of Mines, Golden. ORAL

Hydrogeology [14], Geochemistry Aqueous [6], Geophysics/Tectonophysics/Seismology [11]

T82 ▲ Surface Water–Groundwater Connections

GSA Hydrogeology Division. Kenneth E. Bencala, U.S. Geological Survey, Menlo Park, California; George M. Hornberger, University of Virginia, Charlottesville. ORAL

Hydrogeology [14], Geochemistry Aqueous [6], Environmental Geoscience [5]

T83 ▲ Artificial Recharge Through the Vadose Zone

GSA Hydrogeology Division. Daniel B. Stephens, Stephens & Associates, Albuquerque, New Mexico. ORAL

Hydrogeology [14], Engineering Geology [4], Environmental Geoscience [5]

T84 ▲ Closed-Basin Lakes: Hydrogeology, Geochemistry, Water Management, and Environmental Impacts

GSA Hydrogeology Division. David B. Rogers, Los Alamos National Laboratory, Los Alamos, New Mexico; John W. Hess, Desert Research Institute, Las Vegas, Nevada. ORAL and POSTER sessions

Hydrogeology [14], Geochemistry Aqueous [6], Environmental Geoscience [5]

T85 ▲ Natural Attenuation Processes

GSA Hydrogeology Division. Cheong-Yip R. Yuen, Argonne National Laboratory, Argonne, Illinois; John Pardue, Louisiana State University, Baton Rouge. ORAL

Hydrogeology [14], Environmental Geoscience [5], Geomicrobiology [10]

T86 ▲ Physical Modeling for Process Understanding and Model Validation in Subsurface Flow and Transport

GSA Hydrogeology Division. Tissa H. Illangasekare, Colorado School of Mines, Golden; Kenichi Soga, Cambridge University, Cambridge, UK; Clinton S. Willson, Louisiana State University, Baton Rouge. ORAL

Hydrogeology [14], Environmental Geoscience [5], Geochemistry Aqueous [6]

T87 ▲ 25 Years of Groundwater Modeling: A Special Session in Honor of Professor Mary Anderson

GSA Hydrogeology Division. Chunmiao Zheng, University of Alabama, Tuscaloosa; Charles B. Andrews, S.S. Papadopulos & Associates, Inc., Bethesda, Maryland; Kenneth R. Bradbury, Wisconsin Geological Survey and Natural History Survey, Madison. ORAL

Hydrogeology [14], Environmental Geoscience [5], Geochemistry Other [8]

T88 ▲ Groundwater Flow, Geologic Processes, and Climate Change

GSA Hydrogeology Division. Mark A. Person, University of Minnesota, Minneapolis; Shemin Ge, University of Colorado, Boulder. ORAL

Hydrogeology [14], Paleoclimatology/Paleoceanography [19], Economic Geology [3]

T89 ▲ Stress and Strain in Subsurface Flow Systems

GSA Hydrogeology Division. Evelyn A. Roeloffs, U.S. Geological Survey, Vancouver, Washington; Stuart A. Rojstaczer, Duke University, Durham, North Carolina. ORAL

Hydrogeology [14], Geophysics/Tectonophysics/Seismology [11], Environmental Geoscience [5]

T90 ▲ Flow in Fractured Aquifers—From Field Characterization to Model Construction

GSA Hydrogeology Division. Todd Halihan, University of Texas, Austin; Paul A. Hsieh, U.S. Geological Survey, Menlo Park, California. ORAL

Hydrogeology [14], Engineering Geology [4], Environmental Geoscience [5]

T91 ▲ Studies on Water Movement and Solute Transport in Arid Regions

GSA Hydrogeology Division. Zhongbo Yu, University of Nevada, Las Vegas; Bill Hu, Desert Research Institute, Las Vegas, Nevada. ORAL

Hydrogeology [14], Environmental Geoscience [5], Engineering Geology [4]

T92 ▲ Integrated Geoscience Strategies Applied to Regional Groundwater Modeling: Death Valley Regional Groundwater Flow System

U.S. Geological Survey. Donald S. Sweetkind; Christopher J. Potter, U.S. Geological Survey, Denver, Colorado; Claudia C. Faunt, U.S. Geological Survey, San Diego, California. ORAL

Hydrogeology [14], Structural Geology [32], Tectonics [33]

**T93 ▲ Volcanic Rock Aquifers: Characterization of Flow and Transport in the Saturated and Unsaturated Zones**

GSA Hydrogeology Division. John M. Bukowski, North Wind Environmental; Robert K. Podgorney, Idaho National Engineering and Environmental Laboratory, Idaho Falls. ORAL

Hydrogeology [14], Environmental Geoscience [5], Volcanology [34]

T94 ▲ Heterogeneity in Granular Hydrogeologic and Reservoir Systems

GSA Hydrogeology Division. Robert W. Ritzi, Wright State University, Dayton, Ohio; Graham E. Gogg, University of California, Davis; Gary S. Weissmann, Michigan State University, East Lansing. POSTER

Hydrogeology [14], Sediments, Clastic [30], Environmental Geoscience [5]

T95 ▲ Mining Impacts on Hydrologic Systems

GSA Hydrogeology Division. Mary W. Stoertz, Ohio University, Athens; Joseph J. Donovan, West Virginia University, Morgantown. ORAL and POSTER sessions

Hydrogeology [14], Geochemistry Aqueous [6], Geomicrobiology [10]

T96 ▲ Coupled Hydrologic and Geochemical Processes in Mining Wastes and Other Highly Heterogeneous Media

GSA Hydrogeology Division. Scott W. Tyler, University of Nevada, Reno; Mark Logsdon, Geochemica, Inc., Ojai, California; Robert J. Sterrett, RJS Consulting, Inc., Golden, Colorado. ORAL and POSTER sessions

Hydrogeology [14], Geochemistry Aqueous [6], Environmental Geoscience [5]

T97 ▲ Environmental Isotopes in Hydrogeology

GSA Hydrogeology Division. James M. Thomas, Desert Research Institute, Reno, Nevada; Timothy P. Rose, Lawrence Livermore National Laboratory, Livermore, California. ORAL

Hydrogeology [14], Geochemistry Aqueous [6], Environmental Geoscience [5]

T98 ▲ Solute Cycling in Groundwater and Surface Water

GSA Hydrogeology Division; Geochemical Society. Alan E. Fryar, University of Kentucky, Lexington. ORAL

Hydrogeology [14], Geochemistry Aqueous [6], Environmental Geoscience [5]

T99 ▲ Rare Earth Elements in Groundwater Flow Systems

GSA Hydrogeology Division. Kevin H. Johannesson, Old Dominion University, Norfolk, Virginia. ORAL

Hydrogeology [14], Geochemistry Aqueous [6], Environmental Geoscience [5]

T100 ▲ Phytoremediation of Groundwater and Soil

GSA Hydrogeology Division. John J. Quinn, Argonne National Laboratory, Argonne, Illinois; Jim E. Landmeyer, U.S. Geological Survey, Columbia, South Carolina. ORAL

Hydrogeology [14], Environmental Geoscience [5], Geomicrobiology [10]

T101 ▲ Bioclogging of Subsurface Environments: Laboratory, Field, and Modeling Studies

GSA Hydrogeology Division; American Geophysical Union. Blythe L. Hoyle, Iowa State University, Ames; Philippe Bayeve, Cornell University, Ithaca, New York. COMBINED ORAL and POSTER SESSION

Hydrogeology [14], Geomicrobiology [10], Engineering Geology [4]

T102 ▲ Groundwater Xenobiotics: Bacterial and Pathogenic Transport, Storage, and Viability in Shallow Surface-Influenced Groundwater Systems

GSA Hydrogeology Division. Ralph K. Davis, University of Arkansas, Fayetteville; Barbara J. Mahler, U.S. Geological Survey, Austin, Texas. ORAL

Hydrogeology [14], Geomicrobiology [10], Environmental Geoscience [5]

T103 ▲ Innovative Applications in Water Supply and Environmental Investigation, Remediation, and Risk Assessment

GSA Hydrogeology Division. Michael J. Basal, Redding, California; Nathan R. Brown, CH2M HILL, Redding, California. ORAL

Hydrogeology [14], Environmental Geoscience [5], Engineering Geology [4]

T104 ▲ Redox Manipulation for Groundwater Remediation

GSA Hydrogeology Division. Shawn G. Benner; David W. Blowes, University of Waterloo, Waterloo, Ontario. COMBINED ORAL and POSTER SESSION

Hydrogeology [14], Geochemistry Aqueous [6], Geomicrobiology [10]

T105 ▲ Restoring and Sustaining Aquifers for Their In-Situ Values

GSA Hydrogeology Division; GSA Institute for Earth Science and the Environment. Abe Springer, Northern Arizona University, Flagstaff; David Kreamer, University of Nevada, Las Vegas. ORAL

Hydrogeology [14], Engineering Geology [4], Environmental Geoscience [5]

T106 ▲ Application of Electromagnetic Geophysical Methods to Hydrologic Investigations

GSA Hydrogeology Division; GSA Geophysics Division. Paul A. Ferre, University of Arizona, Tucson. ORAL

Hydrogeology [14], Geophysics/Tectonophysics/Seismology [11], Environmental Geoscience [5]

T107 ▲ Postaudits of Subsurface Remedial Systems

GSA Hydrogeology Division. Gustavious P. Williams, Argonne National Laboratory, Argonne, Illinois; Ira May, Army Environmental Center, Aberdeen, Maryland. ORAL

Hydrogeology [14], Environmental Geoscience [5], Engineering Geology [4]

T108 ▲ Geomicrobiology: Microbial Communities and Geochemistry

Geochemical Society. Susanne Douglas, NASA Jet Propulsion Laboratory, Pasadena, California; Matthew Schrenk, University of Washington, Seattle. ORAL and POSTER sessions

Geomicrobiology [10], Geochemistry Aqueous [6], Micropaleontology [16]

T109 ▲ Long-Term Changes in Sea-water Chemistry: Causes and Responses

Tim K. Lowenstein; Sean T. Brennan; Mike N. Timofeeff, State University of New York at Binghamton. ORAL

Geochemistry Aqueous [6], Paleoclimatology/Paleoceanography [19], Paleontology/Paleobotany [20]

T110 ▲ Paleosols, Soils and the Composition of Ancient Atmospheres

GSA International Division. Paul A. Schroeder, University of Georgia, Athens; Crayton J. Yapp, Southern Methodist University, Dallas, Texas. ORAL

Geochemistry Other [8], Paleoclimatology/Paleoceanography [19], Mineralogy/Crystallography [17]

T111 ▲ Secondary Mineralization in the Unsaturated Zone at Yucca Mountain, Nevada

Geochemical Society. Nick S. Wilson; Jean S. Cline, University of Nevada, Las Vegas. ORAL

Geochemistry Other [8], Geochemistry Aqueous [6], Environmental Geoscience [5]

T112 ▲ Reactive Transport Modeling: Theory and Applications

Geochemical Society. Lauren B. Browning; Debra Hughson, Southwest Research Institute, San Antonio, Texas. ORAL

Geochemistry Aqueous [6], Hydrogeology [14], Geochemistry Other [8]



T113 ▲ Sources, Transport, Fate, and Toxicology of Trace Metals in the Environment: A Tribute to Ron Fuge

International Association of Geochemistry and Cosmochemistry. David T. Long, Michigan State University, East Lansing; Gunter Faure, Ohio State University, Columbus. ORAL

Geochemistry Aqueous [6], Environmental Geoscience [5], Geochemistry Other [8]

T114 ▲ The Colloidal Chemistry of Natural Waters

GSA Hydrogeology Division. Lisa L. Stillings; Lisa Shevenell, University of Nevada, Reno. ORAL

Geochemistry Aqueous [6], Environmental Geoscience [5], Hydrogeology [14]

PALEONTOLOGY AND ARCHAEOLOGY TOPICAL SESSIONS

T115 ▲ Frontiers in the Palynological Sciences

American Association of Stratigraphic Palynologists. Thomas D. Demchuk, Conoco Inc., Houston, Texas; Fred J. Rich, Georgia Southern University, Statesboro; Paul K. Strother, Boston College, Weston, Massachusetts. ORAL

Paleontology/Paleobotany [20], Micropaleontology [16], Stratigraphy [31]

T116 ▲ Pattern and Process in Land Plant Evolution

Paleontological Society. Hallie J. Sims, University of Chicago, Chicago, Illinois; Jennifer Cordi, State University of New York at Binghamton. ORAL

Paleontology/Paleobotany [20], Paleoclimatology/Paleoceanography [19], Coal Geology [2]

T117 ▲ Developing Paleontology: The Emerging Developmental Biology-Paleobiology Synthesis

Paleontological Society. Nigel C. Hughes, University of California, Riverside; Kevin J. Peterson, California Institute of Technology, Pasadena; Mary C. Droser, University of California, Riverside. ORAL

Paleontology/Paleobotany [20], Micropaleontology [16], Geomicrobiology [10]

T118 ▲ Evolving Biodiversity: From the Field to the Database

Paleontological Society. Charles R. Marshall, Harvard University, Cambridge, Massachusetts; John Alroy, National Center for Ecological Analysis and Synthesis, Santa Barbara, California; Ann F. Budd, University of Iowa, Iowa City. ORAL

Paleontology/Paleobotany [20], Micropaleontology [16], Paleoclimatology/Paleoceanography [19]

T119 ▲ Tropical Marine Paleoenvironments Through Time: Biodiversity, Ecology, and Evolution

Paleontological Society. David Harper, University of Copenhagen, Copenhagen, Denmark; Stephen Donovan, Natural History Museum, London, UK. ORAL

Paleontology/Paleobotany [20], Paleoclimatology/Paleoceanography [19], Environmental Geoscience [5]

T120 ▲ Amid, Pycnodontid and Reptiles from the Cretaceous Fauna of Missouri

Society of Vertebrate Paleontology. Judy G. Armstrong-Hall, Troy Public Schools, Troy, Michigan. POSTER

Paleontology/Paleobotany [20], Sediments, Clastic [30], Geology Education [9]

T121 ▲ Geoarchaeology of Colluvial Landscapes

GSA Archaeological Geology Division; GSA Quaternary Geology and Geomorphology Division. David L. Cremeens, GAI Consultants, Inc., Monroeville, Pennsylvania; J. Steven Kite, West Virginia University, Morgantown. ORAL

Archaeological Geology [1], Quaternary Geology/Geomorphology [27], Sediments, Clastic [30]

T122 ▲ Archaeological Geology in the Far West in the 19th Century

GSA Archaeological Geology Division. Stephen M. Testa, Testa Environmental Corporation, Mokelumne Hill, California. ORAL

Archaeological Geology [1], History of Geology [13], Engineering Geology [4]

T123 ▲ Archaeological Mineralogy and Petrology

GSA Archaeological Geology Division. Jean F. DeMouthe, California Academy of Sciences, San Francisco. ORAL

Archaeological Geology [1], Mineralogy/Crystallography [17], Petrology, Igneous [22]

T124 ▲ The Employment of Geological Techniques for Archaeological Provenance Studies

GSA Archaeological Geology Division. Philip C. La Porta, Graduate Center of the City University of New York, Warwick. ORAL

Archaeological Geology [1], Geochemistry Other [8], Quaternary Geology/Geomorphology [27]

ENVIRONMENTAL GEOSCIENCES AND INFORMATION TECHNOLOGY TOPICAL SESSIONS

T125 ▲ Geology in the National Parks; Research, Mapping, Interpretation, and Education

National Park Service. Bruce A. Heise; James F. Wood, National Park Service, Lakewood, Colorado. ORAL

Geoscience Information [12], Geology Education [9], History of Geology [13]

T126 ▲ Taking the Earth Sciences Public: What Works and What Doesn't

Association of Earth Science Editors. Rex C. Buchanan; Marla Adkins-Heljeson, University of Kansas, Lawrence. ORAL

Geoscience Information [12], Public Policy [26], Geology Education [9]

T127 ▲ Electronic Information Summit: New Developments and Their Impacts

Geoscience Information Society. Sharon N. Tahirkheli, American Geological Institute, Alexandria, Virginia; Lois Heiser, Indiana University, Bloomington. ORAL

Geoscience Information [12], Geology Education [9], Public Policy [26]

T128 ▲ Geological Sequestration of Carbon Dioxide Released from Burning of Fossil Fuels

George D. Guthrie; Hans J. Ziock, Los Alamos National Laboratory, Los Alamos, New Mexico. ORAL

Environmental Geoscience [5], Hydrogeology [14], Mineralogy/Crystallography [17]

T131 ▲ Water Quality in the Arid West: Controls on Inorganic Anthropogenic By-Products

GSA Hydrogeology Division. Gina Tempel; Lisa Shevenell, University of Nevada, Reno. ORAL

Environmental Geoscience [5], Geochemistry Aqueous [6], Hydrogeology [14]

T132 ▲ Ecological-Geochemical Aspects of Technogenic Contaminated-Area Problems

Viktor Dolin; Tamara Dudar, National Academy of Sciences of Ukraine, Kyiv. ORAL

Environmental Geoscience [5], Geochemistry Other [8], Geochemistry Aqueous [6]

T133 ▲ The Impact of Mercury on the Global Environment

Allan Kolker; William Orem, U.S. Geological Survey, Reston, Virginia; Paul Lechler, University of Nevada, Reno. ORAL

Environmental Geoscience [5], Geochemistry Aqueous [6], Public Policy [26]



T134 ▲ Sediment Budget and Restoration Ecology, Sierra Nevada
GSA Quaternary Geology and Geomorphology Division. Roger L. Jacobson; John Tracy; Alan R. Gillespie, Desert Research Institute, Reno, Nevada. ORAL

Environmental Geoscience [5], Quaternary Geology/Geomorphology [27], Hydrogeology [14]

T135 ▲ Holocene Environmental Marginal Marine Events: Foraminiferal Evidence

Cushman Foundation. Jere H. Lipps, University of California, Berkeley; David Scott, Dalhousie University, Halifax, Nova Scotia. ORAL

Environmental Geoscience [5], Marine/Coastal Science [15], Micropaleontology [16]

GEOLOGICAL EDUCATION TOPICAL SESSIONS

T136 ▲ Geoscience Education in a Changing World: New Discoveries, New Technologies, New Opportunities

Digital Library for Earth System Education. David W. Mogk, Montana State University, Bozeman; Cathryn A. Manduca, Carleton College, Northfield, Minnesota. ORAL

Geology Education [9], Geoscience Information [12], Public Policy [26]

T137 ▲ The Role of the World Wide Web in Successfully Augmenting Geoscience Education

National Association of Geoscience Teachers. Robert B. Jorstad; John P. Stimac, Eastern Illinois University, Charleston. ORAL

Geology Education [9], Geoscience Information [12], Non-geoscience [35]

T138 ▲ The Use of Multimedia in Geoscience Instruction: Yet Another Example of the No Significant Difference Phenomenon?

National Association of Geoscience Teachers. John C. Butler, University of Houston, Houston, Texas; Warren D. Huff, University of Cincinnati, Cincinnati, Ohio. ORAL

Geology Education [9], Geoscience Information [12], Public Policy [26]

T139 ▲ Geoscience Ethics—Case Histories

American Institute of Professional Geologists. David M. Abbott, American Institute of Professional Geologists, Denver, Colorado; Fred L. Fox, American Institute of Professional Geologists, Tucson, Arizona. ORAL

Geology Education [9], Public Policy [26], Non-geoscience [35]

T140 ▲ Research on Teaching and Learning in Geoscience

National Association of Geoscience Teachers. Marilyn J. Suiter, National Science Foundation, Arlington, Virginia; Michelle Hall-Wallace, University of Arizona, Tucson. ORAL

Geology Education [9], Geoscience Information [12], Public Policy [26]

T141 ▲ Mining as Geoscience Education I: Bringing Exploration, Production, Economics, and Environmental Impacts into the Classroom

National Association of Geoscience Teachers. Steven C. Semken, Dine College, Shiprock, New Mexico; Gregory Wheeler, California State University, Sacramento. ORAL

Geology Education [9], Economic Geology [3], Environmental Geoscience [5]

T142 ▲ Mining as Geoscience Education II: Mining Among the Mesas, and Other Case Studies from Life in the American Southwest

National Association of Geoscience Teachers; Environmental Response/4th World Project, Natural Resources Department, University of New Hampshire—Durham. Stuart M. Leiderman, University of New Hampshire, Durham; Steve C. Semken, Dine College, Shiprock, New Mexico. ORAL

Geology Education [9], Environmental Geoscience [5], Economic Geology [3]

T143 ▲ An “Archaeological Dig” Model for the Teaching of Historical Geology

Hugh Rance, Queensborough Community College, CUNY, Bayside, New York. ORAL

Geology Education [9], Stratigraphy [31], Paleontology/Paleobotany [20]

T144 ▲ Tools or Technology for Teaching 21st Century Geoscience

National Association of Geoscience Teachers; GSA Education Division. Nancy W. West, College of William and Mary, Williamsburg, Virginia; Ed Geary, Earth Science Insights, Boulder, Colorado. POSTER

Geology Education [9], Environmental Geoscience [5], Tectonics [33]

T145 ▲ Geographical Information Systems: A Teaching and Learning Tool for Enhanced Understanding of Geologic Processes

National Association of Geoscience Teachers. Jeff Niemitz, Dickinson College, Carlisle, Pennsylvania; Alexandra Moore, Ithaca University, Ithaca, New York. ORAL and POSTER sessions

Geology Education [9], Remote Sensing/Geographic Info System [28], Geoscience Information [12]

T146 ▲ K–12 Earth and Space Science Academic Standards from Across the United States: State by State Standards, Development, Implementation, and Assessments

National Association of Geoscience Teachers; GSA Education Committee. Steve C. Good; Richard Busch, West Chester University, West Chester, Pennsylvania. POSTER

Geology Education [9], Geoscience Information [12], Public Policy [26]

T147 ▲ From the Introductory Classroom to Capstone Experience—Integrating Research into the Undergraduate Curriculum

Council on Undergraduate Research, Keck Geology Consortium, National Association of Geoscience Teachers. Ginny Peterson, Western Carolina University, Cullowhee, North Carolina; Jill Singer, SUNY, College at Buffalo, Buffalo, New York; Robert Shuster, University of Nebraska, Omaha. POSTER

Geology Education [9], Environmental Geoscience [5], Geoscience Information [12]

T148 ▲ The Role of Departments in Preparing Graduate Students for Teaching

National Association of Geoscience Teachers. R. Heather Macdonald; P. Geoffrey Feiss, College of William and Mary, Williamsburg, Virginia. POSTER

Geology Education [9], Geoscience Information [12], Public Policy [26]

T149 ▲ Sigma Gamma Epsilon Student Research Poster Session

Sigma Gamma Epsilon. James C. Walters, University of Northern Iowa, Cedar Falls; Charles J. Mankin, Oklahoma Geological Survey, Norman. POSTER

Geology Education [9], Environmental Geoscience [5], Quaternary Geology/Geomorphology [27]

T150 ▲ Geological Art and Illustration Exhibition

Lorena B. Moore, Cheyenne, Wyoming. POSTER

Geology Education [9], Geoscience Information [12], Non-geoscience [35]

T151 ▲ Seeing Through an Artist's Eyes: Exploring the Transformation of Geology's Raw Materials and Theories into Works of Art

Colleen Lynch Gallery. Colleen A. Lynch, St. Andrews, New Brunswick; Elizabeth Wright, School of the Art Institute of Chicago, Chicago, Illinois. POSTER

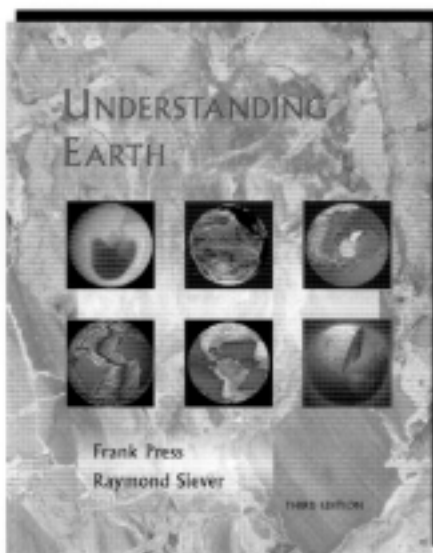
Non-geoscience [35], Environmental Geoscience [5], History of Geology [13]



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Abstracts Deadline: July 25 for paper submissions; August 1 for electronic submissions.

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Submit Abstract Via the Web

(www.geosociety.org)

Abstracts for the 2000 Annual Meeting in Reno can be sent to GSA via the Web. *Note:* Electronic abstracts may be sent to GSA *only* via the Web. They may not be sent by ordinary e-mail. The GSA Web abstract system will accept only abstracts containing pure ASCII content (no italics, graphics, tables, symbols, superscripts, etc.). If you must use non-ASCII characters in your abstract, please use the paper form. Once your abstract is submitted on the Web, you will receive an immediate e-mail confirmation of receipt from GSA with an abstract number assigned.

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3. Copy and paste this into the appropriate fields of the GSA Web form.
4. Complete the personal information on the form, including credit card information for abstracts fee payment (required for both paper and electronic forms).
5. Hit the "SEND" button. You're done! We've included instructions, pull-down lists, and helpful hints on the Web form to save you time and avoid confusion. There's even an error checker to make certain you include all the necessary information.

Example Submission

Topical Submissions must include:

- Topical number—T92
- Key words of the topical session title—Integrated Geoscience Strategies Applied
- One category—Hydrogeology (#14 on abstract form)
- Mode for the session—Oral

Presentation Modes

Oral Mode—This is a verbal presentation before a seated audience. The normal length of an oral presentation is 12 minutes, plus three minutes for discussion. Projection equipment consists of two 35 mm projectors, one overhead projector, and two screens. Requests for video projection and computer display will be addressed on a case-by-case basis. Please indicate if you have special presentation needs by contacting meetings@geosociety.org.

Poster Mode—Each poster session presenter is provided with two horizontal, free-standing display boards approximately 8' wide and 4' high. Precise measurements will appear in the Speaker Guide, which will be available in September. The speaker must be at the poster booth for at least two of the four presentation hours.

Papers for discipline sessions may be submitted in either oral or poster mode. Papers for topical sessions are to be submitted only in the mode noted in the session description. If a topical abstract is submitted in the incorrect mode, the abstract will be transferred automatically to a discipline session.

Submit Abstract on Paper

Paper forms, already distributed for 2000, can be obtained from GSA Abstracts Program Coordinator Nancy Carlson, ncarlson@geosociety.org or call (303) 447-2020, ext. 161.

Paper abstract forms are also available from:

- Conveners of keynote symposia
- Advocates of topical sessions
- Geoscience departments of most colleges and universities
- The GSA Web site, www.geosociety.org, for download.

See the sample below if submitting your abstract on paper. If you are submitting your abstract using the electronic abstract form, the formatting is automatically done for you.

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Please submit only one *volunteered* abstract as speaker or poster presenter in topical and/or discipline sessions. This helps avoid speaker-scheduling conflicts and gives everyone an equal opportunity to be heard. Multiple submissions as speaker-presenter may result in rejection of all abstracts. This limitation does not apply to, nor does it include, invited contributions to keynote symposia or topical sessions.

JOINT TECHNICAL PROGRAM COMMITTEE (JTPC) FINALIZES PROGRAM: AUGUST 25

The JTPC selects abstracts and determines the final session schedule. Speakers will be notified in early September (probably sooner for abstracts submitted electronically). The JTPC includes representatives from those GSA Associated Societies and Divisions participating in the technical program. The JTPC technical program chair was nominated by the Annual Meeting Committee and approved by the GSA Council.

Sample Abstract

TITLE: _____
Do not exceed 160 characters. Type flush left, all upper case.

AUTHORS & ADDRESSES:
For senior author only, provide a postal and an e-mail address.

BODY OF ABSTRACT:
Use 11-point font size.

SAMPLE ABSTRACT FOR SUBMISSION BY PAPER COPY FOR GSA ANNUAL MEETING, SHOWING PREFERRED FORMAT, USE OF UPPER & LOWER CASE, STYLE, ABBREVIATIONS, AND OTHER HINTS

HALBERT-YOUNG, Jane M., Geology Dept., Sunshine Univ., P.O. Box 2, Sunshine, CO 80308, jhyoung@sunun.edu; JONES, Mark L., Jr., and OLSEN, Jack, Smith University, 124 1st St., Silver, CO 80300; DE BEERS, John D., III, Proud Water Inc., Calgary, AB T2M 2R8, CANADA

Please follow this format for all abstracts submitted on paper for the Annual Meeting. This format helps us process your abstract quickly with minimum chance of error.

Abstracts may be sent electronically to GSA for the annual meeting, via the Web. Use our template form under the "Meetings" heading at www.geosociety.org; follow the instructions there. Deadline for electronic abstract submission is August 1, 2000. Please do not submit an abstract both on paper and electronically!

For paper-copy submissions, type all words in your title in upper case letters. Begin all lines of your title flush at the left margin. Indent the first author's name to the first tab and type the LAST name all upper case. Set the last name off with a comma, followed by the first name or initial, then a middle initial; follow this, if appropriate, with another comma then any "Jr.", "Sr.", "II", "III", etc. Provide a valid postal address for each author, and if possible include an e-mail address for the senior author only. Indent the second and any additional author lines to the second tab.

Use the same format for each additional author. Capitalizing each author's LAST name helps ensure that no author is overlooked during the intense capture process.

Start the first paragraph of text flush left, then indent the first line of following paragraphs to the first tab.

Leave NO blank lines except at the end. Your entire abstract must fit entirely inside the light blue lines. Use a type size of 11 points, because your abstract will be reduced to 60% of original size for publication. Finally, in the Key-Word box, type the five most important key words in your abstract; these will be used by others for electronic searching.



Walker Lake, southwest of Hawthorne, western Nevada. Photo by John A. Karachewski.

IEE ANNUAL ENVIRONMENTAL FORUM TOWARD A STEWARDSHIP OF THE GLOBAL COMMONS: PERSPECTIVES FOR THE NEW CENTURY

Co-organizers: A.R. Palmer, G.W. Fisher, P.H. Reitan, and E-an Zen, on behalf of GSA's Critical Issues Committee

Sustainability is the key challenge facing the human enterprise in this new century. An essential component of the challenge is the need to recognize our collective responsibility for the global commons (atmosphere, hydrosphere, biosphere, cryosphere, and lithosphere). We must find ways to more fully engage the stakeholders of the next 50 years in this issue. During the past year, the Critical Issues Committee has produced monthly essays on the key public-domain components of sustainability. This symposium

builds on those essays and is designed to stimulate discussion on ways to further engage and inform the public in the complex issue of a humane, just, equitable, and viable future for humanity.

Topics to be included: **The Issues:** What do we mean by sustainability?; public health perspectives; social justice perspectives; responding to a changing world; we can choose. **The Engines of Change:** The public schools; community and religious involvement; the media. **Wrap-Up:** The view from the social sciences.

Sunday, November 12, 1:30–4:30 p.m.

IEE-SPONSORED EVENTS

Geology on Public Lands: A User's Guide

Cosponsored by the Institute for Earth Science and the Environment (IEE), the National Park Service, the Bureau of Land Management, and the USDA Forest Service

Can your voice make a difference in how public lands and resources are managed? Do you know that a variety of "citizens' processes" are available to you at several points in a land-use decision? That you can speak up during strategic planning for public lands management? When, and for what, you need a permit? Would your institution benefit from a cooperative agreement with a national park or a cost share agreement with a national forest? Are there research opportunities going to waste because we aren't working together on public lands? These questions and many more will be addressed by the workshop leader and a panel of representatives from our co-sponsors. Take-home materials will include lists of useful contacts, decision models, model contracts and agreements, and useful tips for optimizing your use of public lands.

Sunday, November 12, 8 a.m. to 3 p.m.; \$35 registration fee includes materials. Registration required. Contact Karlon Blythe, (303) 447-2020, ext. 136, kblythe@geosociety.org.

Geology in Government Mentor Program

Tuesday, November 14, 12:00–1:30 p.m.

This program is for undergraduate and graduate students. Representatives from four governmental agencies will conduct a panel discussion (with interaction from the audience) addressing topics that include: current

and anticipated future roles for geoscientists within their particular government segment; discussion of interesting or highly visible geoscience projects currently in process; current and future job opportunities within their agency. Free to students; lunch provided. Registration required; limited seating. Contact Karlon Blythe at (303) 447-2020, ext. 136, kblythe@geosociety.org.

Earth Scientists on Capitol Hill: Report from Melody Brown Burkins, GSA 1999–2000 Congressional Science Fellow

Wednesday, November 15, 12:00–1:00 p.m.
Free to meeting participants.

Geology and Public Policy Forum: Issues About the Aging of the Nation's Dams

Wednesday, November 15, 1:30–3:30 p.m.

Four speakers will address topics that include: conceptual basis of the life expectancy of dams and the legal framework; issues related to changing hydrologic conditions and flood frequency following removal of a dam; issues related to reservoir remediation and stabilizing fine-grained sediment loadings; case studies in dam removals. Free to meeting participants.

NSF Town Hall Meeting

Come one! Come all to a National Science Foundation Town Hall Meeting focusing on the Geology and Paleontology (GE) Program and including the scientific areas of geomorphology, sedimentology, stratigraphy, low-temperature geochemistry, coastal geology, and paleontology. H. Richard Lane (hlane@nsf.gov) and Enriqueta Barrera (ebarrera@nsf.gov) will present an up-to-date overview of the program, discuss exciting future directions, and open the floor for questions and answers. Wednesday, November 15, 5:45–7:30 p.m.

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FIELD TRIPS

Students, spouses, and interested guests are encouraged to attend. Trips are technical, and some can be physically rigorous. Participants should be prepared for wet, cold weather. Trips are one to five days long and are led by active field researchers. *Minimum registration for field trips is 12 unless otherwise stated.*

If you register for *only* a field trip, you must pay a \$40 nonregistrant fee in addition to the field trip fee. This fee may be applied toward meeting registration if you decide to attend the meeting. Trip fees include transportation during the trip and a guidebook. Other services such as meals and lodging are indicated by the following letters: B—breakfast, L—lunch, R—refreshments, D—dinner, ON—overnight lodging.

All trips begin and end in Reno at the Reno Hilton Hotel, *unless otherwise indicated.* Some returning postmeeting trips can stop at the Reno/Tahoe International Airport to discharge participants who have evening flights or would prefer to spend the night in a motel closer to the airport. Participants are cautioned against scheduling any tight travel connections with field trip return times, because those times are estimates, and delays in the field can occur. For a list of hotels near the airport and phone numbers, contact Edna Collis, GSA Field Trip Coordinator, GSA Headquarters, (303) 447-2020, ext. 134, ecollis@geosociety.org.

Cancellation deadline is October 13. No refunds will be given after this date. If GSA must cancel a field trip because of logistics or if minimum registration requirements are not met, a full refund will be issued to you after the meeting. Be aware of flight-change penalties imposed by the airlines. Plan alternatives in advance should the trip you are registered for be canceled.

Students:

The *GSA Sedimentary Geology Division* is cosponsoring a few field trips and will subsidize all students who are valid division members. (See individual trip descriptions for those sponsored.) Students must pay the full field trip fee when registering but will be reimbursed \$100 after the GSA meeting by the Sedimentary Geology Division. To be reimbursed, students must apply in writing to Paul K. Link, Dept. of Geology, Box 8072, Idaho State University, Pocatello, ID 83209-3365, (208) 236-3846, linkpaul@isu.edu.

The *GSA Structural Geology and Tectonics Division* offers up to five \$100 scholarships to division-affiliated student members for division-sponsored field trips. Apply in writing, giving name, institution, class, specialty, field trip title, and a one-paragraph rationale, to Jane Selverstone by e-mail only (selver@unm.edu). The deadline to apply is September 15. See the *Structural Geology and Tectonics Division* newsletter for more information.

For further information on any field trip, contact the trip leader or 2000 Field Trip Co-Chairs Paula Noble, (775) 784-6211; Steve Peters, (775) 784-5574; Mary Lahren, (775) 784-6610, Dept. of Geological Sciences, University of Nevada—Reno, Reno, NV 89557, fax 775-784-1833, noblepj@unr.edu, speters@usgs.unr.edu, lahren@mines.unr.edu.

NEW GSA PUBLICATION—1999 was the inaugural year of GSA's Field Trip Guidebook series. Look for this new series at the GSA Bookstore exhibit in Reno. After the meeting, copies will be available for purchase through the GSA Member Service Center, 1-888-443-4472.

Premeeting Trips

1. ▲ Reconstruction of Basin and Range Extension and Westward Motion of the Sierra Nevada Block

Wednesday–Sunday, November 8–12. Cosponsored by *GSA Structural Geology and Tectonics Division*. Brian Wernicke, Division of Geological & Planetary Sciences, California Institute of Technology, Pasadena, CA 91125, (626) 395-6192, fax 626-568-0935, brian@gps.caltech.edu; Robert A. Brady, Nathan A. Niemi. Maximum: 35; minimum: 7. Cost: \$520 (4B, 4L, 3D, R, 4ON, vans). *Begins and ends in Las Vegas.*

Critical examination of key geologic and geodetic relationships bearing on the timing and magnitude of spreading in the central Basin and Range province and motion of the Sierra, and evidence for initiation and slip on low-angle normal faults.

2. ▲ Neoproterozoic Glacial Record in the Death Valley Region, California and Nevada

Thursday–Sunday, November 9–12. Cosponsored by *GSA Sedimentary Geology Division*. Mark Abolins, Dept. of Geography and Geology, Middle Tennessee State University, Murfreesboro, TN 37132, (615) 904-8372, fax 615-898-5592, mabolins@mtsu.edu; Frank Corsetti, Anthony Prave, Catherine Summa. Maximum: 24, minimum: 12. Cost: \$340 (3L, R, 3ON, vans). *Begins and ends in Las Vegas.*

Examination of key physical stratigraphic and chemostratigraphic evidence supporting new interpretations of the Neoproterozoic glacial record.

3. ▲ Balloons (Rising and Sinking) to Cookie Cutters: AMS, Pluton Emplacement, and Wall-Rock Deformation in the White-Inyo Range, California

Friday–Sunday, November 10–12. Cosponsored by *GSA Structural Geology and Tectonics Division*. Sven Morgan, Dept. of Geology, Central Michigan University, Mount Pleasant, MI 48859, (517) 774-1082, fax 517-774-2142, Soren.Morgan@cmich.edu; Rick Law, Michel de Saint Blanquat. Maxi-



Yosemite Falls, Yosemite National Park, California. Photo by Martin Miller.

mum: 21, minimum: 7. Cost: \$265 (2B, 2L, 2D, 2ON, R, vans).

Intense deformation of sedimentary wall rocks will be compared with magmatic and solid-state flow (AMS) of pluton interiors in an examination of the contrasting intrusive styles of three plutons.

4. ▲ Hydrologic and Geologic Characteristics of the Yucca Mountain Site Relevant to the Performance of a Potential Repository

Friday–Sunday, November 10–12. Cosponsored by *GSA Hydrogeology Division*. Russ Patterson, U.S. Dept. of Energy, Yucca Mountain Site Characterization Office, MS 523, P.O. Box 30307, N. Las Vegas, NV 89036, (702) 794-5469, fax 702-794-5559, russ_patterson@ymp.gov; John S. Stuckless, Robert A. Levich. Maximum: 45; minimum: 12. Cost: \$220 (2L, 1D, R, 2ON, bus). *Begins in Las Vegas and ends in Reno.*

Examines the potential repository site in the Miocene volcanic tuffs at Yucca Mountain, Nevada, including a tour of the underground Exploratory Studies Facility and the surrounding regional hydrologic and geologic features. (See Topical Session 79.) *Contact trip leader for required security clearance information and deadlines.*

5. ▲ Lower Paleozoic Stratigraphy and Structure of Central Nevada: Comparisons and Contrasts Between the Lower and Upper Plates of the Roberts Mountains Thrust

Friday–Sunday, November 10–12. Cosponsored by *GSA Structural Geology and Tectonics Division*. Stan Finney, Dept. of Geological Sciences, California State University, Long Beach, CA 90840-3902, (562) 985-8637, fax 562-985-8683, scfinney@csulb.edu; Paula Noble, Kelly Cluer. Maximum: 24; minimum: 6. Cost: \$300 (2B, 2L, R, 2ON, vans).



Roberts Mountains thrust, stratigraphy of the upper and lower plates and stratigraphic correlations between them, and nature of structural complexities in the upper plate.

6. ▲ Neogene and Quaternary Hillslope Records, Basin Sedimentation, and Landscape Evolution of Southeastern Nevada

Friday–Sunday, November 10–12. Cosponsored by *GSA Quaternary Geology and Geomorphology Division*, *GSA Sedimentary Geology Division*, and *SEPM (Society for Sedimentary Geology)*. Joel L. Pederson, Dept. of Geology, Utah State University, Logan, UT 84322-4505, (435) 797-7097, fax 435-797-1588, bolo@cc.usu.edu. Maximum: 26; minimum 10. Cost: \$250 (1B, 2L, 1D, R, 2ON, vans). *Begins in Las Vegas and ends in Reno.*

See rare exposures of Miocene–Pliocene buried hillslopes and colluvium and their implications for climate controls on basin sedimentology; also will see Muddy Creek Formation through Quaternary stratigraphy and discuss drainage evolution of the region.

7. ▲ Paleozoic Roof Pendants of the Eastern Sierra Nevada

Friday–Sunday, November 10–12. David C. Greene, Dept. of Geology and Geography, Denison University, Granville, OH 43001, (740) 587-6476, fax 740-587-6417, greened@Denison.edu; Calvin H. Stevens. Maximum: 30; minimum: 12. Cost: \$210 (2L, R, 2ON, vans).

Stratigraphy and structure of Paleozoic roof pendants accessible or viewable in spectacular range-front exposures along the east side of the Sierra Nevada.

8. ▲ Paleozoic Subduction Complex and Paleozoic–Mesozoic Volcano–Plutonic Assemblages in the Northern Sierra Terrane

Friday–Sunday, November 10–12. Cosponsored by *GSA Structural Geology and Tectonics Division*. Richard E. Hanson, Dept. of Geology, Texas Christian University, Fort Worth, TX 76129, (817) 257-7996, fax 817-257-7789, hanson@gamma.is.tcu.edu; Gary H. Girty, Richard A. Schweickert, David S. Harwood. Maximum: 27; minimum: 12. Cost: \$265 (3B, 3L, R, 2ON, vans).

Tectonic and magmatic evolution of a major subduction-complex–island-arc terrane in the U.S. Cordillera. Will include study of submarine arc deposits and variably deformed and tilted plutonic suites.

9. ▲ Exploring the Lower Truckee River and Pyramid Lake

Saturday, November 11. Cosponsored by *GSA Hydrogeology Division*. Scott W. Tyler, Hydrologic Sciences Graduate Program, University of Nevada, MS 175, Reno, NV 89557, (775) 784-6250, fax 775-784-1953, styler@unr.edu; Larry Benson, W. Berry

Lyons. Maximum: 40; minimum 12. Cost: \$75 (1L, R, vans).

A unique opportunity to view the paleohydrology and modern issues of water resources in the arid West. Through the deep Truckee River Canyon, culminating at the spectacular Pyramid Lake, we will link the geology, hydrology, and archaeology of this unique environment.

10. ▲ Geoarchaeology and Holocene Landscape History of the Carson Desert, Western Nevada

Sunday, November 12. David Rhode, Earth and Ecosystem Sciences, Desert Research Institute, 2215 Raggio Pkwy., Reno, NV 89512, (775) 673-7310, fax 775-674-7557, dave@dri.edu; Ken Adams, Robert G. Elston. Maximum: 39 minimum: 12. Cost: \$70 (1L, R, vans).

Explore several archaeological and geological localities (Hidden Cave, Stillwater Marsh, and Lahontan lake deposits) to examine regional environmental change and human adaptation in the Carson Desert.

11. ▲ Verdi Basin: A Record of Neogene Deformation in the Reno Area

Sunday, November 12. Cosponsored by *GSA Structural Geology and Tectonics Division*. Jim Trexler, Dept. of Geological Sciences/172, University of Nevada, Reno, NV 89557-0138, (775) 784-1504, fax 775-784-1833, trexler@mines.unr.edu; Pat Cashman, Chris Henry, Mike Perkins. Maximum: 40; minimum 12. Cost: \$70 (1L, R, vans). *Begins on Saturday evening with a talk and slide presentation.*

Neogene basin deposits record the late Miocene–Pliocene evolution of the Sierra Nevada–Basin and Range transition zone. Volcanic and sedimentary rocks from the Boca and Verdi basins west of Reno.

Concurrent with the Meeting

12. ▲ Lake Tahoe Active Faults, Landslides, and Tsunamis

Wednesday, November 15. Cosponsored by *GSA Engineering Geology Division* and *GSA Structural Geology and Tectonics Division*. Rich Schweickert, Dept. of Geological Sciences/172, University of Nevada, Reno, NV 89557-0138, (775) 784-6901, fax 775-784-1833, richschw@unr.edu; Mary Lahren, Bob Karlin, Jim Howle, Ken Smith. Maximum: 60; minimum 12. Cost: \$70 (1L, R, bus).

New evidence for active faults, landslides, and tsunamis across the Lake Tahoe basin. Origins, active seismicity, and neotectonic framework of Lake Tahoe. (See Topical Session 17.)

Postmeeting Trips

13. ▲ Middle Mesozoic Plutonism and Deformation in the Western Sierra Nevada Foothills, California

Thursday–Saturday, November 16–18. Cosponsored by *GSA Structural Geology and Tectonics Division*. Diane Clemens-Knott, Dept. of Geological Sciences, California State University, P.O. Box 6850, Fullerton, CA 92834-6850, (714) 278-2369, fax 714-278-7266, dclemenskott@fullerton.edu; Michael B. Wolf, Jason B. Saleeby. Maximum: 32; minimum: 12. Cost: \$285 (2B, 2L, 1D, R, 3ON, vans).

Late Jurassic to Early Cretaceous, mafic to intermediate layered cumulates, ring- and sheeted-dike complexes, ophiolite-hosted plutons, and synmagmatic shear zones exposed between Owens and Stokes Mountains.

14. ▲ Structural Relationships of Pre-Tertiary Rocks at the Nevada Test Site

Thursday–Saturday, November 16–18. Cosponsored by *GSA Structural Geology and Tectonics Division*. Pat Cashman, Dept. of Geological Sciences, University of Nevada, Reno, NV 89557-0138, (775) 784-6924, fax 775-784-1833, pcashman@mines.unr.edu; Jim Trexler, Jim Cole. Maximum: 34; minimum 12. Cost: \$230 (2B, 2L, 1D, R, 2ON, vans). *Begins and ends in Las Vegas.*

Structural and stratigraphic evidence for multiple contractional deformation events in upper Paleozoic rocks on the Nevada Test Site; also cores and subsurface data. *U.S. citizens only. Contact trip leader for required security clearance information and deadlines.*

15. ▲ Global Ordovician Series Boundaries and Global Event Biohorizons, Monitor Range and Roberts Mountains, Nevada

Thursday–Saturday, November 16–18. Stan Finney, Dept. of Geological Sciences, California State University, Long Beach, CA 90840-3902, (562) 985-8637, fax 562-985-8683, scfinney@csulb.edu; Ray Ethington. Maximum: 24; minimum 6. Cost: \$295 (2L, R, 2ON, vans).

Platform and basin sections critical for definition of the base of the global Middle Ordovician Series, and newly studied sections with exceptional records of Late Ordovician mass extinction. (See Topical Session 32.)

16. ▲ Late Cenozoic Crustal Extension and Magmatism in Southern Death Valley, California

Friday–Sunday, November 17–19. Cosponsored by *GSA Structural Geology and Tectonics Division*. James Calzia, U.S. Geological Survey, 345 Middlefield Road, MS 901, Menlo Park, CA 94025, (650) 329-5538, fax 650-329-5130, jcalzia@usgs.gov; Tapani Ramo. Maximum: 26; minimum 9. Cost:



\$340 (1B, 3L, 2D, R, 3ON, vans). *Begins and ends in Las Vegas.*

Late Cenozoic crustal extension in southern Death Valley accommodated by numerous normal and strike-slip faults; coeval magmatic rocks include bimodal volcanic flows and hypabyssal granitic plutons. Review of geologic, geochemical, and isotopic data leads to a model that relates these tectonic and magmatic processes. (See Topical Session 43.)

17. ▲ Lake Tecopa and Its Environs: 2.5 Million Years of Exposed History and Its Relevance to Tectonic, Climatic, Erosion, and Groundwater Issues at the Proposed Nuclear-Waste Repository at Yucca Mountain

Friday, November 17. Cosponsored by *Geological Society of Nevada, Southern Branch*. Roger B. Morrison, Morrison & Associates, 13150 W. 9th Avenue, Golden, CO 80401, (303) 233-1997, fax 303-233-0495, rbmorrison@earthlink.net; Martin D. Mifflin. Maximum: 30; minimum: 12. Cost: \$95 (1L, R, vans). *Begins and ends in Las Vegas.*

The geologic framework from Las Vegas to the Amargosa Desert and Tecopa Valley, California, emphasizing hydrogeologic and geomorphologic aspects, particularly the 2.5-m.y.-old stratigraphic record of Lake Tecopa, and their relevance to groundwater, erosion, and tectonic issues at the proposed nuclear-waste repository at Yucca Mountain, Nevada.

18. ▲ Pershing Carbonate Olistostrome: A Marker for the Shelf-Basin Transition in Triassic Western North America

Friday, November 17. Fred Heck, Dept. of Physical Sciences, Ferris State University, Big Rapids, MI 49307, (231) 591-2580, fax 231-591-2545, heckf@ferris.edu. Maximum: 26; minimum: 12. Cost: \$80 (1L, R, vans).

The edge of the Triassic continental shelf, where a remarkable sequence of carbonate gravity flows transported huge clasts of layered shelf-edge carbonates to the base of slope.

19. ▲ Hydrology of the Tahoe Basin

Friday-Saturday, November 17-18. Cosponsored by *GSA Hydrogeology Division*. Graham Fogg, Hydrologic Sciences, University of California, Davis, CA 95616, (530) 752-0453, fax 530-752-5262, gefogg@ucdavis.edu; David Prudic, Patrick Glancy. Maximum: 20; minimum: 12. Cost: \$225 (1B, 2L, 1D, R, 1ON, vans).

Visits to recent and ongoing field study sites to explore subsurface stormflow and snow-melt processes, groundwater-surface water interaction, hot springs, influence of development on wetlands, MTBE impacts on groundwater resources, and Lake Tahoe limnology via the *John B. LeConte* research vessel.

20. ▲ Earthquakes, Surface Faulting, and Paleoseismology of the Central Nevada Seismic Belt: The Grand Tour

Friday-Sunday, November 17-19. Cosponsored by *GSA Engineering Geology Division, GSA Geophysics Division, and GSA Structural Geology and Tectonics Division*. John Caskey, Dept. of Geosciences, San Francisco State University, San Francisco, CA 94132, (415) 405-0353, fax 415-338-7705, caskey@sfsu.edu; John W. Bell, D. Burton Slemmons (Honorary). Maximum: 22; minimum: 6. Cost: \$345 (3L, R, 2ON, vans).
Historical surface faulting associated with several large-magnitude earthquakes that occurred in central Nevada in 1954: Rainbow Mountain-Stillwater (M 6.4, M 7.0), Fairview Peak (M 7.2), and Dixie Valley (M 6.8). Results of paleoseismic studies in these rupture zones, including exploratory trenching, chronostratigraphic studies, and slip rate estimations. Visits to adjacent areas that have not ruptured historically, including the Stillwater seismic gap, for comparison of late Quaternary fault slip histories and analysis of the long-term behavior of the central Nevada seismic belt.

21. ▲ Eocene Magmatism and Extension in Northeastern Nevada and Their Role in Generating Carlin-Type Gold Deposits

Friday-Sunday, November 17-19. Chris Henry, Nevada Bureau of Mines and Geology, MS 178, University of Nevada, Reno, NV 89557-0088, (775) 784-6691, ext. 128, fax 775-784-1709, chenny@unr.edu; Mike Ressel. Maximum: 31; minimum: 10. Cost: \$260 (3L, 1D, R, 2ON, vans).

This trip examines Eocene magmatism and extension around the Carlin trend, where Eocene intrusions were the heat source for mineralization. Participants will gain an understanding of the variety of Eocene magmatic styles, the relation (or not) between magmatism and extension, and the influence of both on ore formation.

Other Field Trips

Registration and information can be obtained from the contact person listed for each course.

▲ Contrasting Styles of Intrusion-associated Hydrothermal Systems

Tuesday-Saturday, November 7-11. Sponsored by *Society of Economic Geologists*. John H. Dilles, Geoscience Dept., Wilkinson Hall 104, Oregon State University, Corvallis, OR 97331, (541) 737-1245, fax 541-737-1200, dillesj@geo.orst.edu; Mark D. Barton, David Johnson, Dept. of Geosciences, University of Arizona, Tucson, AZ 85721, (520) 626-4962, fax 520-621-2672, barton@geo.arizona.edu; John Proffett, P.O. Box 772066, Eagle River, AK 99577, (907) 696-5480, fax 907-696-4851, proffettak@aol.com. Marco Einaudi, Dept. of Geological and Environmental Sciences, Stanford University,

Stanford, CA 94305, (650) 725-0575, fax 650-727-0979, marco@pangea.stanford.edu.

Day 1: Weak lithophile-element mineralization associated with aqueous fluids released from a Cretaceous peraluminous stock at Birch Creek, White Mountains. Days 2 and 3: Cross-sectional exposures of the Yerington district of porphyry and skarn Cu mineralization produced by magmatic fluids from a Jurassic calc-alkaline batholith and from convected evaporitic brines and dilute meteoric waters. Day 4: Fe-oxide deposits of the Jurassic Humboldt lopolith, where basaltic intrusions provided a heat source that convected evaporitic brines.

Limit: 36. Cost: \$540 SEG members, \$270 SEG student members, \$625 nonmembers, includes field trip transportation, all meals, accommodations (double occupancy), and guidebook. Preregistration required. Send check, payable to Society of Economic Geologists, 7811 Shaffer Pkwy., Littleton, CO 80127; (720) 981-7882; fax 720-981-7874, seg@segweb.org, www.segweb.org.

▲ Exploring East of the Summit: Geology and Mining and Cultural History in the Reno-Carson City Area

Monday, November 13, 12:00 noon to 10:00 p.m. Sponsored by *Association of Earth Science Editors*.

Limit: 80. Cost: To be decided. For trip description, information, and registration: Richard Jones, Wyoming State Geological Survey, P.O. Box 3008, University Station, Laramie, WY 82071, (307) 766-2286, fax 307-766-2605, rjones@wsgs.uwyo.edu.

▲ Regional Geology and Ore Deposits of the Getchell Region, Humboldt County, Nevada

Friday-Sunday, November 17-19. Sponsored by *Society of Economic Geologists*.

Elizabeth Jones Crafford, GeoLogic Services, 1460 W. 12th St., Reno, NV 89503, (775) 846-7901, fax 775-746-4280, aejonescrafford@geologicsservices.com.

Tour the Twin Creeks Mine, Getchell Mine, and Pinson and Preble Mines on the eastern side of the Osgood Mountains. Local stratigraphy and mineralization and alteration styles associated with Carlin-type gold mineralization. Examine the unique complex structural history of the region. Discuss new ideas for the Paleozoic tectonic history of Nevada.

Limit: 42. Cost: \$260, includes field trip transportation, box lunches, one dinner, two nights accommodations (double occupancy), and guidebook. Preregistration required. Send check, payable to Society of Economic Geologists, 7811 Shaffer Pkwy., Littleton, CO 80127; (720) 981-7882; fax 720-981-7874, seg@segweb.org, www.segweb.org.



SHORT COURSES, WORKSHOPS, AND FORUMS

GSA-Sponsored Short Courses

GSA short courses will be held immediately before the Annual Meeting and are open to members and nonmembers. If you register for *only* a short course, you must pay a \$40 nonregistrant fee in addition to the course fee. This fee may be applied toward meeting registration if you decide to attend the meeting. Preregistration is recommended; on-site course registration is \$30 additional.

All courses sponsored by GSA offer CEUs. A CEU is defined as 10 contact hours of participation in an organized continuing-education experience under responsible sponsorship, capable direction, and qualified instruction. A contact hour is defined as a typical 60-minute classroom instructional session or its equivalent. Ten instructional hours are required for one CEU. For CEU record-keeping purposes, please be sure to include your social security number on the registration form.

Cancellation Deadline: October 13, 2000

STUDENTS:

The *GSA Structural Geology and Tectonics Division* offers up to five \$100 scholarships to division-affiliated student members for division-sponsored short courses. Apply in writing, giving name, institution, class, specialty, short-course title, and a one-paragraph rationale, to Jane Selverstone by e-mail only (selver@unm.edu). The deadline to apply is September 15. See the *Structural Geology and Tectonics Division* newsletter for more information.

The *GSA Engineering Geology Division* will subsidize the first five student registrants for Short Course 3 who are valid division members. Students *must pay the full course fee* when registering, but will be reimbursed \$50 after the GSA meeting by the Engineering Geology Division.

The *GSA Hydrogeology Division* will subsidize the first student registrant for Short Course 4, 5, or 7 who is a valid division member. The student *must pay the full course fee* when registering, but will be reimbursed \$50 after the GSA meeting by the Hydrogeology Division.

For more information, contact Edna Collis, GSA Continuing Education Coordinator, (303) 447-2020, ext. 134, or ecollis@geosociety.org.

PREMEETING COURSES**1. ▲ Characterization and Modeling Fluid Flow in Fault and Fracture Zones: The Reality and the Idealized**

Saturday–Sunday, November 11–12, 8:00 a.m. to 5:00 p.m. both days. Reno Hilton. Cosponsored by *GSA Structural Geology and Tectonics Division*.

Faults and fracture zones significantly affect rates and patterns of fluid flow in Earth's crust. Understanding how to characterize

and model fluid flow and solute transport in faults and fracture zones aids in numerous applications. For professionals in the environmental, resource extract, and geotechnical fields; professors of structural geology, geology for engineers, and hydrogeology; and researchers in structural geology, hydrogeology, petroleum geology, sedimentologists, and economic geologists.

Faculty: James P. Evans—Utah State University; Ph.D., Texas A&M University; Jonathan S. Caine—U.S. Geological Survey, Denver; Ph.D., University of Utah; Craig B. Forster—University of Utah; Ph.D., University of British Columbia.

Limit: 40. Fee: \$470, students \$450; includes course manual and lunches. CEUs: 1.6.

2. ▲ Digital Mapping Systems: Digital Data Capture and Analysis for the Field Geoscientist

Saturday–Sunday, November 11–12, 8:00 a.m. to 5:00 p.m. both days. Reno Hilton. Cosponsored by *GSA Structural Geology and Tectonics Division*.

This course will integrate practical “hands-on” data acquisition and map generation with an overview of the technology (GPS, lasers, and data management). Case histories will illustrate mapping methodology and analysis, from the most sophisticated and expensive to the most basic, least expensive system configurations. For geoscientists with an interest in field studies; it is assumed that participants will have an undergraduate geology background and a basic knowledge of computer applications.

Faculty: Kent Nielsen—Dept. of Geosciences, University of Texas at Dallas; Ph.D., University of British Columbia; Carlos Aiken—Dept. of Geosciences, University of Texas at Dallas; Ph.D., University of Arizona; Xueming Xu—Dept. of Geosciences, University of Texas at Dallas; M.S., Chinese Academy of Science.

Limit: 30. Fee: \$470, students \$450; includes course manual, lunches, and field trip transportation. CEUs 1.6.

3. ▲ Science of Earthquakes: Earthquake Geology and Paleoseismology

Saturday, November 11, 8:00 a.m. to 5:00 p.m., Sunday, November 12, 8:00 a.m. to 12:00 noon. Reno Hilton. Cosponsored by *GSA Structural Geology and Tectonics Division*; *GSA Engineering Geology Division*.

Characterizing the likelihood of future seismicity for fault systems is difficult without long histories of past earthquakes. Recommended for those who have a strong background in either geology or geophysics, this short course will address the long-term permanent deformation that accumulates from seismic processes, as studied at trench scales. Also case studies of historic surface ruptures along well-characterized active faults.

Faculty: Charles M. Rubin—Central Washington University, Ellensburg; Ph.D., California Institute of Technology; Thomas K. Rockwell—San Diego State University; Ph.D., University of California, Santa Barbara.

Limit: 40. Fee: \$370, students \$350; includes course manual and lunch on Saturday. CEUs: 1.6.

4. ▲ Applications of Environmental Isotopes in Groundwater Studies

Sunday, November 12, 8:00 a.m. to 5:00 p.m. Reno Hilton. Cosponsored by *GSA Hydrogeology Division*.

Recommended for those with a senior undergraduate or graduate background in physical science who wish to apply isotope techniques in groundwater studies, this course will provide practical information about the use of environmental isotopes in key issues that have relevance for groundwater management. These include evaluation of recharge areas, groundwater residence time, surface water–groundwater interaction, and evaluation of sources and behavior of contaminants associated with agriculture, industry, and urban development.

Faculty: Ramon Aravena—University of Waterloo, Waterloo, Ontario; Ph.D., University of Waterloo; Ian D. Clark—University of Ottawa, Ottawa, Ontario; Ph.D., Université de Paris-Sud, Orsay, France.

Limit: 50. Fee: \$340, students \$320; includes course manual and lunch. CEUs: 0.8.

5. ▲ Field Methods for Estimation of Spatial Variations in Hydraulic Conductivity: Recent Advances and Practical Ramifications

Sunday, November 12, 8:00 a.m. to 5:00 p.m. Reno Hilton. Cosponsored by *GSA Hydrogeology Division*.

Designed to attract a wide range of hydrogeologists, this introductory course will be an overview of methods for estimation of hydraulic conductivity in saturated formations. Techniques in current use as well as promising methods under development will be considered. Particular emphasis on practical issues of test design and data interpretation. All methods will be illustrated with case studies.

Faculty: James J. Butler, Jr.—Kansas Geological Survey; Ph.D., Stanford University; Vitaly A. Zlotnick—University of Nebraska—Lincoln; Ph.D., National Institute of Hydrogeology and Engineering Geology, Moscow, Russia.

Limit: 40. Fee: \$350, students \$330; includes course manual and lunch. CEUs: 0.8.



6. ▲ Mobilization of Metals from Fossil Fuels: Impacts to the Environment and Human Health

Sunday, November 12, 8:00 a.m. to 12:00 noon. Reno Hilton. Cosponsored by *GSA Coal Geology Division*.

Appropriate for those with little or no prior experience in energy geology, this course will examine the sources of metals in fossil fuels and their combustion products, and related environmental and health effects. Issues include toxic elements such as mercury and arsenic, particulate matter, and regulatory aspects. Case studies of health impacts in the U.S. and abroad.

Faculty: Robert B. Finkelman—U.S. Geological Survey, Reston, Virginia; Ph.D., University of Maryland; Allan Kolker—U.S. Geological Survey, Reston, Virginia; Ph.D., State University of New York at Stony Brook; Leslie Ruppert—U.S. Geological Survey, Reston, Virginia; M.S., George Washington University.

Limit: 40. Fee: \$230, students \$210; includes course manual. CEUs: 0.4.

7. ▲ Practical Methods in Applied Contaminant Geochemistry: From Characterization to Remediation

Sunday, November 12, 8:00 a.m. to 5:00 p.m. Reno Hilton. Cosponsored by *GSA Hydrogeology Division*.

Geochemical data obtained as part of regulatory-driven hydrogeologic investigations are commonly too incomplete, of scant number, and of insufficient quality to use the kinds of geochemical approaches that are normally learned in university courses on acid-base and chemical-equilibrium geochemistry. This course will teach the "practical" essentials of contaminant geochemistry and how to effectively apply them in consulting (and, arguably, academic!) practice.

Faculty: Donald I. Siegel—Dept. of Earth Sciences, Syracuse University; Ph.D., University of Minnesota.

Limit: 40. Fee: \$300, students \$280; includes course manual and lunch. CEUs: 0.8.

POSTMEETING COURSE

8. ▲ GIS for the Geosciences

Friday–Saturday, November 17–18, 8:00 a.m. to 5:00 p.m. both days. Reno Hilton. Cosponsored by *GSA Planetary Geology Division*.

Aimed at teaching the practicing and student geoscientist about GIS methods without being specific to any software or product, this course will include: case studies, data availability, spatial data models, attribute databases, map projections, datums and GPS, spatial error and rectification, spatial statistics, sampling and interpolation, analytical GIS, probability theory applied to geoscience problems, and modeling (maximum likelihood, weights of evidence, fuzzy logic).

Faculty: Richard Bedell—Homestake Mining Company, Sparks, Nevada; M.Sc., University of London; M.Sc., University of Toronto.

Limit: 60. Fee: \$370, students \$350; includes course manual and lunches. CEUs: 1.6.

Other Courses, Workshops, and Forums

Registration and information can be obtained from the contact person listed for each course.

▲ Gold in 2000

Friday–Saturday, November 10–11. Cal-Neva Resort, Lake Tahoe, Nevada. Sponsored by *Society of Economic Geologists*.

Economic gold deposits occur in many geological settings around the world. This course will provide both academic and industry points of view on the origin of and exploration for most of the important deposit styles. Invited presentations and contributed posters will ensure a breadth of coverage and lively discussion. For a list of invited contributions, see www.segweb.org, and select Meetings.

Conveners: Philip Brown—Dept. of Geology and Geophysics, 1215 W. Dayton, University of Wisconsin, Madison, WI 53706, (608) 262-5954, fax 608-262-0693, pbrown@geology.wisc.edu; Steffen Hagemann—Dept. of Geology and Geophysics, Centre for Strategic Mineral Deposits, University of Western Australia, Nedlands WA 6907, Australia, (61)-8-9380-1517, fax 61-8-9380-1178, shageman@geol.uwa.edu.au.

Limit: 125. Cost: To be published in the July issue of the SEG Newsletter and on the SEG Web site; will include two nights lodging, some meals, reception, and short-course volume. Preregistration required. Send check, payable to Society of Economic Geologists, 7811 Shaffer Pkwy., Littleton, CO 80127; (720) 981-7882; fax 720-981-7874, seg@segweb.org, www.segweb.org.

▲ 3-D Seismic Interpretation: A Primer for Geologists

Saturday–Sunday, November 11–12, 8:00 a.m.–5:00 p.m. both days. Reno Hilton. Sponsored by *SEPM (Society for Sedimentary Geology)*.

This popular course, presented previously at national meetings and to petroleum producers across the country, examines the theory and application of 3-D seismic technology from an interpreter's perspective. The focus is on how 3-D seismic data can be exploited to better understand and define subsurface stratigraphy, structure, and rock and sediment properties.

Faculty: Bruce Hart—Dept. of Earth and Planetary Sciences, McGill University, Montreal, Quebec.

Limit: 35. Fee: \$425 SEPM members, \$455 nonmembers, \$300 students; includes course notes and refreshments. Preregis-

tration required. For information and registration: Judy Tarpley, Continuing Education and Meetings Coordinator, SEPM, 1731 E. 71st St., Tulsa, OK 74136, 1-800-865-9765, or (918) 493-3361, ext. 22, fax 918-493-2093, jtarp@sepm.org.

▲ Sequence Stratigraphy for Graduate Students

Saturday–Sunday, November 11–12. Sponsored by *ExxonMobil Exploration Company*.

This course teaches graduate students the principles, concepts, and methods of sequence stratigraphy, an informal chronostratigraphic methodology that uses stratal surfaces (beds, parasequences, sequence boundaries) to subdivide the stratigraphic record. Since sequence stratigraphic units cross traditional lithostratigraphic boundaries, they can be used to define coeval facies successions, as well as explain and predict the distribution, thickness variations, and connectivity of reservoirs, source rocks, and seals. These factors are critical in hydrocarbon exploitation, groundwater and environmental assessment, and a proper understanding of the stratigraphic record. Using exercises that employ outcrop, core, well-log, and seismic data, the course provides a hands-on experience on sequence stratigraphy and clastic facies analysis.

Limit: 30. No fee. Preregistration required. For information and registration: Art Donovan, ExxonMobil Upstream Research Company, (713) 301-0575, art.d.donovan@exxon.sprint.com.

▲ Sulfate Minerals: Crystallography, Geochemistry, and Environmental Significance

Saturday–Sunday, November 11–12. Granlibakken Resort and Conference Center, Tahoe City, California. Sponsored by *Mineralogical Society of America*.

Sulfate minerals provide important insights into geochemical processes. This course will show how sulfate minerals are used to explore for economic deposits and to remove Fe and Al from leach solutions in hydrometallurgy. Stable isotopic compositions of sulfate minerals can reveal the volatile evolution and mineral deposition in hydrothermal systems. Efflorescent sulfate salts affect the storage and release of potentially toxic metals during weathering and influence groundwater chemistry in some major aquifers through sulfide oxidation and sulfate reduction. Sulfate minerals and aqueous sulfate are important in evaporite sequences.

Limit: 100. Fees: Professional: \$360 MSA members, \$440 nonmembers; students: \$120 MSA members, \$150 nonmembers (registration fees received before August 31 will include banquet). For information and registration: MSA Business Office, 1015 18th St. NW, Suite 601, Washington, DC 20036-5274, (202) 775-4344, fax 202-775-0018, business@minsocam.org, or visit and



register on the MSA home page: www.minsocam.org.

▲ High-Precision Chronostratigraphy by Graphic Correlation

Sunday, November 12, 8:00 a.m.–5:00 p.m.
Sponsored by *Paleontological Society*.

This workshop will review concepts, assumptions, and applications, and provide hands-on experience with graphic correlation for the analysis of bioevent occurrences and for testing hypotheses of synchronicity of event deposits and sequence stratigraphic contacts. Participants are encouraged to bring their own laptops. All participants will receive a notebook with examples for future reference, a diskette to be used with GraphCor, and a bibliography.

Faculty: Robert W. Scott and H. Richard Lane.

Limit: 30; *Firm* minimum: 20. Fee: \$35. *Preregistration required by October 13*. For information and registration: Robert W. Scott, Precision Stratigraphy Associates, RR3, Box 103-3, Cleveland, OK 74020, phone and fax: 918-243-7871, rwscott@ix.netcom.com.

▲ Gender Equity Workshop

Sunday, November 12, 9:00 a.m.–1:00 p.m.
Cosponsored by *GSA Committee on Minorities and Women in the Geosciences*, *National Association for Black Geologists and Geophysicists*, and *Mills College Women's Leadership Institute*.

This workshop will review case studies of lawsuits for women and minorities in science around the nation. Participants will learn the elements of a successful legal battle (class action and individual), how to keep control of your case, the climate in the courts, the issues, and what is happening nationwide to women in academia. We will discuss the MIT study that increased awareness and has resulted in a cascade effect of change on campuses nationwide. You will learn how to be proactive, how to form your own support group on campus and off, and how to advocate for change. We will cover resources such as Web sites, periodicals, books for information and awareness, and contacts around the United States who are willing to listen, advocate, and support your efforts to improve gender equity.

Limit: 40. No fee. *Preregistration required*. For information and registration: Leuren Moret, (925) 609-9650 (phone and fax), leurenmoret@yahoo.com.

▲ Job Hunting in the Geosciences

Sunday, November 12, 1:00–3:00 p.m. Co-sponsored by *Association for Women Geoscientists*, *GSA Committee on Minorities*, and *Women in the Geosciences*.

Learn the job-hunting skills necessary to survive in today's changing and challenging job market. These skills may be applied to jobs in government, industry, and academia. Topics include: how to search for advertised jobs in your area of specialty and network for the hidden job market; how to network through professional organizations as well as through casual contacts; how to write a resumé and curriculum vitae that will get you an interview (AWG's excellent, moderately priced resumé-writing workbook for geoscientists will be available); and how to develop interviewing skills that will differentiate you from the competition.

Limit: 75. No fee. *Preregistration by November 5 is required*. For information and registration: Pranoti M. Asher, Dept. of Geology and Geography, Georgia Southern University, Statesboro, GA 30460-8149, (912) 681-0338, fax 912-681-0668, pasher@gsaix2.cc.gasou.edu; or Leuren Moret, (925) 609-9650, leurenmoret@yahoo.com.

▲ Phanerozoic Terrestrial Ecosystems

Sunday, November 12, 8:00 a.m.–5:00 p.m.
Sponsored by *Paleontological Society*.

This course will explore the acquisition and conquest of the terrestrial landscape with new data for the early Paleozoic, adaptation and expansion of the five kingdoms and their ecological interactions over the entire Phanerozoic record, and ecosystem response to perturbation and recovery at times of major biotic crises in the fossil record.

Faculty: Robert A. Gastaldo and William A. DiMichele.

No fee or registration. Course notes will be available for purchase on-site. For information: Robert A. Gastaldo, Dept. of Geology, Colby College, Waterville, ME 04901-8858, (207) 872-3244, fax 207-872-3845, ragastal@colby.edu.

Forums

▲ Digital Forum

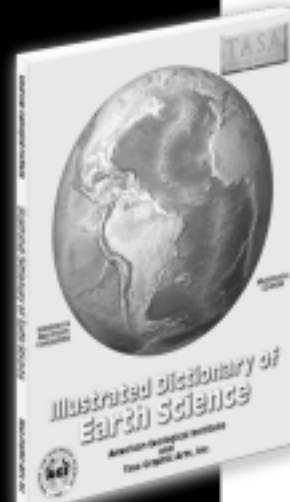
Wednesday, November 15. Sponsored by *Geoscience Information Society*.

Provides a venue where scientists, information specialists, and publishers gather and discuss issues concerning electronic resources and view new applications in electronic data for the earth scientist.

No fee or registration. *Open to all meeting registrants*. Information: Adonna Fleming, James A. Michener Library, University of Northern Colorado, Greeley, CO 80639, (970) 351-1530, fax 970-351-2963, acflemi@unco.edu.

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K-16 EDUCATION WORKSHOPS AND EVENTS

K-16 teachers, graduate students, and scientists—Please join us for an exciting and diverse series of workshops for educators at all grade levels. Plan to preregister to ensure your spot in the session of your choice. Meeting registration is required in addition to course fees (\$40 registration for K-12 Professionals or for weekend-only workshop participation). Graduate-level recertification credits from the Colorado School of Mines will be offered for participation in both workshops and technical sessions for an additional fee and written work. Credit information will be available at the workshops. For more information, contact Holly Devaul, (303) 447-2020, ext. 150, hdevaul@geosociety.org.

Look for the **Share-a-thon** in the Education Division and Committee booth in the Exhibit Hall this year. If you would like to participate, please contact Elizabeth Haynes, eahayn0@uky.edu.

An **Educators Social Hour** will be held Monday, November 13, 5:00 to 7:00 p.m., and the **NAGT Early Career Faculty Session** will be Tuesday, November 14, 7:00 to 9:00 p.m. This session will look at the issues facing faculty at the outset of their careers in academia. This will be a networking opportunity as well as a forum for more structured discussions around specific topics identified by the group. For more information, contact Heather Macdonald, rhmacd@wm.edu.

▲ **NAGT Workshop on Innovative Course Design for Teaching Undergraduate Geoscience**
Saturday, November 11, 8:00 a.m. to 5:00 p.m.

This workshop will give participants experience with a systematic method for designing innovative courses in geoscience. After a brief introduction, each participant will spend the day working with the facilitators and other participants on a course of his or her choice. Participants will leave the workshop with a concrete plan for revising the course to make it more effective in terms of what the students accomplish.

Course fee: \$30. Registration required. For information: Barbara J. Tewksbury, Hamilton College, (315) 859-4713, btewksbu@hamilton.edu.

▲ **Evolution: Investigating the Evidence: A Workshop for Teachers Grades 6 to 16**
Saturday, November 11, 8:00 a.m. to 4:30 p.m.

Sponsored by the *Paleontological Society* and the *University of California Museum of Paleontology*

What is the evidence for evolution? Why the controversies? How can teachers present major evolutionary concepts in their classrooms in meaningful ways? Join an ener-

getic team of paleontologists and educators in a full-day, hands-on workshop. We will concentrate on what science is and is not, the importance of teaching evolution, and the best teaching strategies. The format will be a combination of informative sessions, discussions, and hands-on activities presented by grade level.

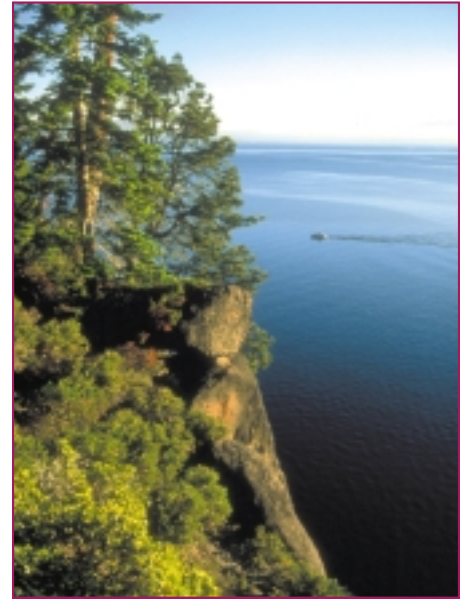
Course fee: \$30; includes a 400-page book. Registration required. For information: Dale Springer, Bloomsburg University, (570) 389-4747; or Judy Scotchmoor, University of California, Berkeley, (510) 642-4877, judys@ucmp1.berkeley.edu.

▲ **Fun with Planetary Geology in the Classroom**
Saturday, November 11, 8:00 a.m. to 5:00 p.m.

Have you ever wondered what another planet's surface looks like or how it was formed? Come explore our solar system in a fun-filled, action-packed, full-day workshop. We'll use numerous hands-on activities to explore the many geologic processes that are active in our solar system. Workshop activities are targeted for teachers of *grades 4-8*, with discussion directed to the higher and lower grades and special-needs audiences. All activities have been tested by teachers, scientists, and students and are guaranteed to stimulate your students' imagination. Registered participants will receive classroom materials, including recent posters, maps, slide sets, activity workbooks, and much more. Dress casually! Course fee: \$20. Registration required. For information: Cassandra Coombs, (843) 953-8279, coombsc@cofc.edu.

▲ **Hands-On Geographic Information Systems Workshop—Beginner to Intermediate ArcView GIS Using Voyager**
Saturday, November 11, 8:00 a.m. to 5:00 p.m.

Sponsored by *Environmental Systems Research Institute* and *University of Tulsa*
GIS is rapidly becoming the new paradigm for bringing active, real-world geography and geographic analysis into the *K-12* classroom. This workshop will prepare K-12 educators to use GIS in the classroom to examine the concepts of spatial analysis. Emphasis will be on map building, finding and using data, and classroom implementation strategies. The workshop will also develop the necessary skills for the second ESRI class, *Advanced ArcView*. Exercises will include construction of basic maps, using and importing existing databases, modifying databases, and creating new databases. Participants will learn to identify attributes within a map and use those data analytically. Participants will receive materials that they can use in their classroom teachings and research. Course fee: \$20 for lunch; other costs supported by ESRI. Registration



Lake Tahoe and Mesozoic granitic rocks, Rubicon Trail, D.L. Bliss State Park. Photo by John A. Karachewski.

required. For information: George Dailey, ESRI, gdailey@esri.com, or Sheila McGinty-Davis, University of Tulsa, (918) 631-2090, sheila-mcginty@utulsa.edu.

▲ **This Dynamic Planet: A Teaching Companion**
Saturday, November 11, 8:00 a.m. to 12:00 noon

Sponsored by *U.S. Geological Survey*

USGS scientists and classroom teachers from across the country are creating a new Teaching Companion to accompany the popular USGS world map of volcanoes, earthquakes, and plate tectonics, *This Dynamic Planet*, and the book *This Dynamic Earth: The Story of Plate Tectonics*. The Companion includes classroom activities, science updates, important concepts about plate tectonics, and additional diagrams, maps, and resources. In this workshop for teachers of *grades 6-14*, we'll review content, do several of the hands-on activities, and discuss where plate tectonics fits across the curriculum. Participants will receive copies of the map and book, as well as excerpts from the draft Teaching Companion. Course fee: \$5. Registration required. For information: Leslie C. Gordon, U.S. Geological Survey, Menlo Park, CA, (650) 329-4006, lgordon@usgs.gov.

▲ **Inquiry Learning in Plate Tectonics Using Real Earth Data Sets**
Saturday, November 11, 1:00 to 5:00 p.m.

After a brief introduction of the theory of plate tectonics, you will learn how to use the *Our Dynamic Planet* CD-ROM to implement student activities that lead them to discover evidence that supports the theory of plate tectonics. Emphasis will be on how



an authentic science experience can be framed so that your students will experience some of the excitement and struggle that scientists experience. Issues relating to scientific writing will be discussed. We will also identify investigations that could be done with the data sets, so that you can better advise your students. Course fee: \$15. Registration required. For information: William A. Prothero, University of California, Santa Barbara, prothero@magic.ucsb.edu. This workshop will be at the University of Nevada, Reno campus.

▲ Dr. Art's Guide to Planet Earth: For Earthlings Ages 12 to 120
Saturday, November 11, 1:00 to 5:00 p.m.

This workshop builds upon a systems approach to Earth's matter, energy, and life. Three principles provide a simple yet powerful framework for understanding how our planet has been working for billions of years, and for analyzing environmental issues such as global climate change. The principles are that Earth is essentially a closed system for matter, an open system for energy, and a networked system for life. They are summarized by three phrases (Matter Cycles, Energy Flows, Life Webs). The Planet Guide project includes a book and a Web site (www.planetguide.org—still in draft form). The site will include animations and lesson plans, while the book

focuses on providing the background science in an engaging text. The book and Web site address a large number of National Science Content Standards including those from the Earth/Space, Life, and Physical Sciences, as well as Unifying Concepts, and Science in Personal/Social Perspectives. The workshop will provide an in-depth experience of this Earth systems science educational resource. It will include lecture, discussion, simulations, and experiments. Course fee: \$30. Registration required. For information: Art Sussman, WestEd, (415) 615-3206, asussma@wested.org.

▲ Exploring Plate Tectonics: A Hands-On Approach
Sunday, November 12, 9:00 a.m. to 4:00 p.m.

This active workshop will introduce educators (K-16) to the concepts behind the theory of plate tectonics. Effective teaching strategies and a comprehensive series of hands-on activities that employ maps, puzzles, and models are used to show the evidence for Pangaea, lithospheric plates, and plate motion. Learn why the continental drift hypothesis is not accepted, and take back to your classrooms an entire unit of plate tectonics activities. Participants will also receive a beautiful map of the seafloor. Course fee: \$25. Registration required. For information: Leslie Reynolds Sautter,

College of Charleston, (843) 953-5586, sautterl@cofc.edu.

▲ NAGT Workshop: Effective Laboratory Exercises for Entry-Level Geoscience Courses: What Works and Why, Challenges, and Practical Examples

Sunday, November 12, 8:00 a.m. to 5:00 p.m.

Topics covered in this workshop will include new teaching strategies, case studies of effective exercises and their development, challenges associated with new and innovative approaches to laboratory instruction, and strategies for working with graduate teaching assistants. Participants will have an opportunity to share copies of successful exercises. Course fee: \$30. Registration required. For information: Laurel P. Goodell, Princeton University, (609) 258-1043, laurel@princeton.edu.

▲ NAGT Workshop: Preparing to Teach: A Workshop for Graduate Students

Sunday, November 12, 8:00 a.m. to 5:00 p.m.

This workshop for graduate students interested in an academic career will focus on development as a reflective teacher. Topics will include what educational research tells us about teaching and learning, effective teaching strategies, teaching portfolios, and preparing for the first year of teaching. Also

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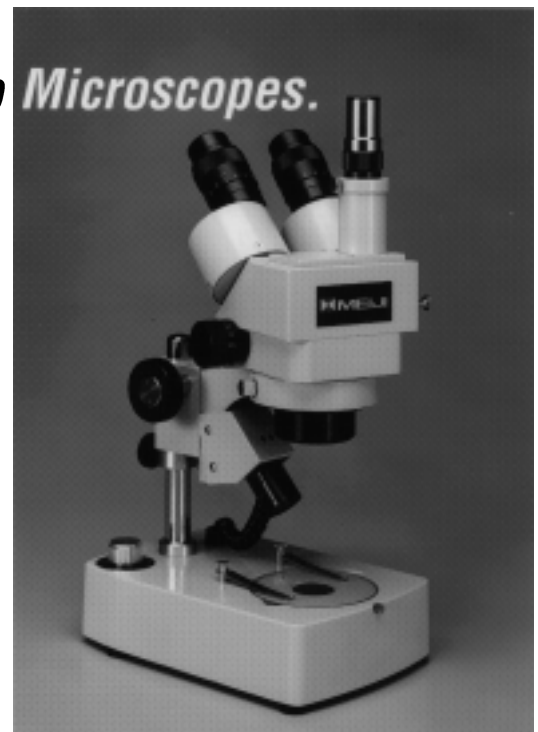
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included will be a panel discussion with early career geology faculty. Course fee: \$25. Registration required. For information: R. Heather Macdonald, College of William and Mary, (757) 221-2443, rhmacd@wm.edu, or Robyn Wright Dunbar, Stanford University, (650) 723-3920, robyn.dunbar@stanford.edu.

▲ Hands-On Geographic Information Systems Workshop—Intermediate to Advanced ArcView GIS Using Spatial, 3-D, and Image Extensions, Including an Introductory Demo of ArcInfo 8
Sunday, November 12, 8:00 a.m. to 5:00 p.m.

Sponsored by *Environmental Systems Research Institute*

This workshop is for *K-16* educators who are familiar with basic ArcView software and want to learn how to use and exploit the extensions for geologic studies and classroom teaching. Emphasis will be on the Spatial Analysis extension with the new ModelBuilder. ModelBuilder allows students to build flow-process diagrams with various types of data in a grid format connected by mathematical functions. Different data sets can be added and math functions altered to test various modeling theories. The 3-D Analysis extension will be introduced to show how geologic data can be visualized. Various processes in remote sensing will be introduced using the Image Analyst extension. The new ArcInfo 8 software will be demonstrated briefly, including ArcMap, ArcCatalogue, and ArcTools. Participants will receive materials that they can use in their classroom or in their research. Course fee: \$20 for lunch; other costs supported by ESRI. Registration required. For information: Ann Johnson, ESRI, (909) 793-2853, ajohnson@esri.com.

▲ Earthquakes—A One-Day Workshop for College Faculty
Sunday, November 12, 8:00 a.m. to 5:00 p.m.

Sponsored by *Incorporated Research Institutions for Seismology* with funding from the *National Science Foundation*

Faculty from two-year and four-year colleges and universities who teach introductory earth science courses and want to learn more about earthquakes, seismology, and related plate tectonics will find this workshop useful. Topics include: causes of earthquakes, earthquakes and plate tectonics, propagation of seismic waves, seismographs, earthquake locations, statistics and data, Earth's interior structure, and earthquake hazards. Lessons and activities associated with these topics and demonstrated and practiced during the workshop emphasize hands-on and inquiry-based learning. The activities are suitable for use in introductory undergraduate earth science courses as demonstrations and laboratory exercises. The workshop will be limited to 25 participants. Participation is FREE, but registration is required. About \$120 worth of materials (notebook with lessons and

hands-on activities, maps, curriculum materials, earthquake book, posters, software, and other teaching aids) will be provided to each participant. To apply for participation in the workshop, send a brief letter indicating your interest and describing your earth science teaching duties. Send letters of application to: Earthquake Workshop, L.W. Braile, Dept. of Earth & Atmospheric Sciences, 1397 Civil Engineering Bldg., Purdue University, West Lafayette, IN 47907-1397. For further information call (765) 494-5979 or e-mail braile@purdue.edu. Be sure to include phone numbers, fax number, and e-mail address, if available, in your letter. Letters of application must be received by September 1, 2000. You will be notified of the decision concerning your participation by September 8, 2000. If we do not have 25 participants by September 8, we may be able to accept late applications. The workshop will be conducted by Michelle Hall-Wallace, University of Arizona; Lawrence W. Braile, Purdue University; and Catherine Johnson, IRIS Consortium.

▲ How to Establish an Undergraduate Research Program
Sunday, November 12, 8:00 a.m. to 12:00 noon

Sponsored by the *Council on Undergraduate Research*

This workshop will present strategies and approaches for developing an undergraduate research program. It is designed primarily for recently hired geoscience faculty and graduate students preparing to enter academic positions. Topics include: interviewing at a college or university with an undergraduate research expectation, selection of research projects appropriate for undergraduates, academic preparation of students, mentoring undergraduate research students, and funding undergraduate research programs. Course fee: \$20. Registration required. Information: Jill Singer, Buffalo State College, Buffalo, New York, (716) 878-4724, singerjk@buffalostate.edu.

▲ Linking Science and Art Through the Use of Sands and Microfossils
Sunday, November 12, 1:00 to 5:00 p.m.

Sponsored by *U.S. Bureau of Land Management*

Learn how to engage students in *grades K-8* in the discovery of the world of sands and microfossils and how this beautiful world can be understood through drawing. Students will look and draw and draw and look until the wonders scientists see become real and vital. The instructor has used these techniques with a wide range of students, including gifted and talented elementary students, inner city youth at a public school summer camp, and large tour groups at a local children's museum. Pictures drawn by all these groups will be available for your inspection. You will mount, examine, and

draw sands and microfossil specimens from around the world.

Course fee: \$30. Registration required. For information: Lucille Tamm, U.S. Bureau of Land Management, Milwaukee Field Office, (414) 297-4419, Lucille_Tamm@es.blm.gov.

▲ Integrating GIS into Geoscience Curriculum with a Marine Science Emphasis
Sunday, November 12, 8:00 a.m. to 5:00 p.m.

This workshop will provide GIS activities, software, data, and curriculum for teachers interested in successfully using GIS technology to complement their current earth system science curriculum. Participants will work with ArcView GIS software and Excel spreadsheets to visualize, map, analyze, and interpret various data sets related to hurricanes, coastal water quality, coral reefs, sea-turtle nesting sites, red tides, coastal erosion, and other geoscience topics. Participants will also use GPS units to collect their own data, which they will analyze using ArcView GIS software. Workshop participants will learn about where to find additional sources of GIS data, career opportunities in GIS and geoscience-related fields, and case studies of GIS used in education throughout the country. In addition, they will receive GIS and other geoscience educational materials from ESRI, NOAA, NASA, EPA, USGS, and other organizations. The activities and curriculum for this workshop are aligned with the National Science Education Standards and are appropriate for *grades 6-14*.

Course fee: \$20. Registration required. For information: Genevieve Healy, University of Miami Rosenstiel School, (704) 373-1518, ghealy@bellsouth.net.

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EMPLOYMENT INTERVIEW SERVICE

Interviews

Sunday, November 12, 12:00 noon to 5:00 p.m.; Monday, November 13 through Wednesday, November 15, 8:00 a.m. to 5:00 p.m.

If you need qualified scientists to fill staff needs or are looking for employment in the earth sciences, you are invited to participate in the GSA Employment Interview Service. All organizations seeking qualified earth scientists are urged to submit notices of their vacancies and their requests for lists of applicants before the meeting. Interview booths may be reserved at the meeting in half-day increments for a nominal fee. GSA staff will handle all interview scheduling with Employment Service applicants. Many job seekers have found the Employment Interview Service critical to their successful search for positions. The registration fee for applicants is \$35 for GSA members and associates and \$65 for nonmembers, and it includes year-round service as well as interviewing at the annual meeting. Students completing degrees during 2000 are particularly encouraged to join the Employment

Matching Service and to check the job offerings at the meeting. Information for applicants who sign up with the Employment Matching Service by September 30, 2000, will be included in the materials that employers receive prior to the meeting, so submit your application form and résumé early to receive maximum exposure. Be sure to indicate on the form that you will be attending the meeting. Both applicants and employers may also register on-site. For additional information or forms, contact Nancy Williams in Member Services at member@geosociety.org or (303) 447-2020. Forms are also available in the Professional Development section of GSA's Web site at www.geosociety.org.

Employment Opportunities in the Geological Sciences Roundtable Discussions

Sunday, November 12, 1:00 to 3:00 p.m.

This annual forum on employment opportunities in the geosciences allows valuable one-on-one interaction between panel members and individuals or small groups. Experts in each of the areas listed below will

conduct his or her own "mini-roundtable" discussion designed to provide a better opportunity to field both general and specific questions on a more personal, individualized basis. These roundtable discussions will be in the Employment Service area during the interview registration time; however, *you do not have to be signed up for either the annual meeting or the Employment Matching Service to participate in these discussions.* Everyone—professionals and students—is encouraged to attend and to join as many of the discussions as you like. Roundtable discussion leaders from the following areas will be featured this year:

- Academic and Education
- Mining
- Federal Government
- State and Local Government
- Consulting
- Petroleum
- Résumé Review

For additional information, contact Nancy Williams, Member Services, GSA Headquarters, at member@geosociety.org or (303) 447-2020.



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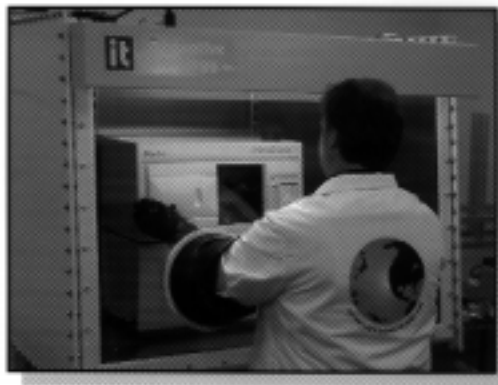
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EXHIBITS OPENING AND WELCOMING PARTY

Sunday, November 12, 5:00 to 7:30 p.m.
(Immediately following the Presidential Address and Awards Ceremony)

Reno/Sparks Convention Center, Exhibit Hall

Join your colleagues to celebrate the kickoff for the 2000 GSA Annual Meeting and Exposition! Meet with friends and plan the next four days of

networking and meeting activities. Relax and take this opportunity to view the exhibits and enjoy a complimentary beverage.

EXHIBITS

Visit GSA's Web site, www.geosociety.orgmeetings/2000/exhibit1.htm, to browse an online listing of current exhibitors' products and services. For information on becoming an exhibitor, contact GSA Exhibits Manager Tammy White, (303) 447-2020, ext. 141, or twhite@geosociety.org.

CONVENIENT EXHIBIT HALL HOURS

Sunday, November 12
5:00 p.m.–7:30 p.m.

Monday, November 13
11:00 a.m.–7:30 p.m.

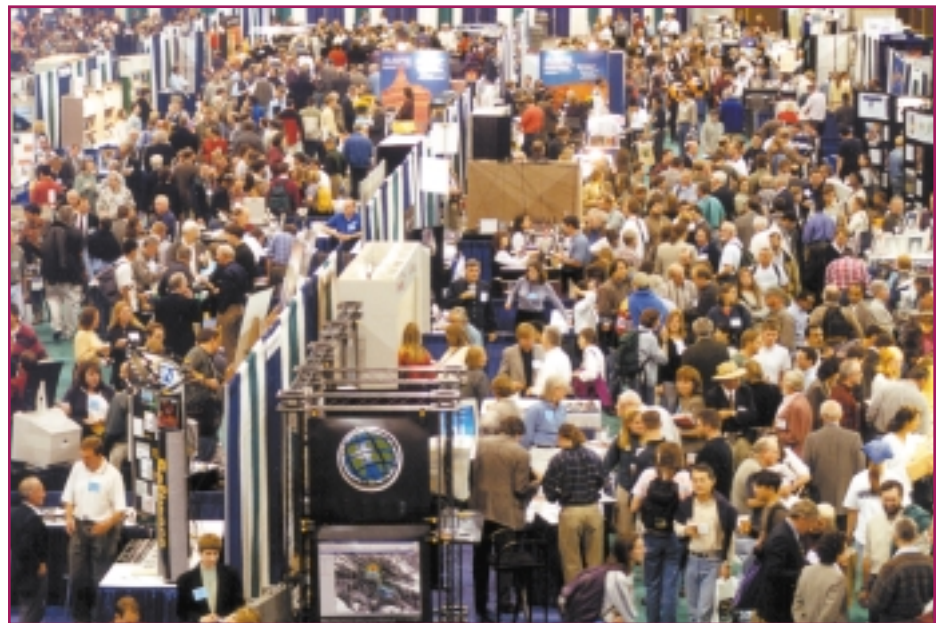
Tuesday, November 14
9:00 a.m.–5:30 p.m.

Wednesday, November 15
9:00 a.m.–5:30 p.m.

Thursday, November 16
Closed EXCEPT FOR GSA
HEADQUARTERS SERVICES

GSA HEADQUARTERS SERVICES

In addition to the regular exhibit hall hours, the GSA Headquarters Services booths will also be open on Thursday, from 9:00 a.m. to 2:00 p.m., to provide GSA members and meeting attendees an additional opportunity for access to GSA services, staff, and publications.



VISIT US!

Graduate School Information Forum

Sunday, November 12, 5:00 to 7:30 p.m.;
Monday, November 13, 11:00 a.m. to 7:30
p.m.; Tuesday, November 14 and Wednes-
day, November 15, 9:00 a.m. to 5:30 p.m.

Reno/Sparks Convention Center, Exhibit
Hall

STUDENTS: Make one trip, to Reno, to
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graduate schools from around the country

without spending the travel time and
money to go to each school for informa-
tion and interviews. A complete list of par-
ticipating schools, with contact names and
telephone numbers, is available by con-
tacting GSA Headquarters, (303) 447-2020,
ext. 186, or meetings@geosociety.org.

UNIVERSITIES: The deadline for reserva-
tions is July 31, 2000, for your school name
to appear in the September issue of *GSA*

Today and the on-site program book.
Reservations received after July 31 will be
accepted on a space-available basis and
will not appear in either publication. If
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please contact GSA Headquarters at the
number or e-mail address above.

A schedule of participating schools will be
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Research Systems, Inc.

RockWare, Inc.

Tasa Graphic Arts, Inc.

Educational Publishers

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Columbia University Press

Harcourt College Publisher/Saunders
College Publishing

John Wiley & Sons, Inc.

National Research Council Canada—
Research Press

Oxford University Press

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Princeton University Press

University of Chicago Press

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Publications, Maps, Films, and Teaching Aids

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GUEST ACTIVITIES

All GSA registered attendees are welcome to sign up for the tours offered as part of the Guest Program. Reservations for all tours will be accepted on a first-come, first-served basis. The tour operator requires a final guarantee several days in advance for most tours, and most tours have minimums and maximums. Please register early to guarantee your spot. Tours may be canceled if minimums are not met. Plan to arrive at the hospitality room 15 minutes before the scheduled departure times for check-in.

▲ Birding in the Great Basin

Sunday, November 12, 6:30 a.m. –12:30 p.m.

Northwestern Nevada is a land of many contrasts, offering desert shrublands, alkali flats, riparian areas, marshes, wetlands, ponds, grasslands, agricultural land, and more. In November the area is filled with wintering raptors and waterfowl, among many other kinds of birds. Volunteers from the Lahontan Audubon Society will lead you to nearby areas that harbor a wide variety of birds; the specific sites will be chosen just before your visit to ensure maximum diversity. Probable areas include Sierra Valley in nearby California, a mix of shrublands, agricultural fields, wetlands, and the headwaters of the Feather River (lots of raptors), and the Swan Lake Nature Study Area, a pond and marshland just north of Reno that provides a winter home for numerous species of waterfowl, including tundra swans.

Cost: \$28 (includes transportation, snack of fresh fruit and juice, and donation to local Audubon Society). Minimum: 10; maximum: 36.

▲ Lake Tahoe-Truckee Connection

Monday, November 13, and Tuesday, November 14, 9:30 a.m. –4:00 p.m.

We will begin our day traveling west along the Truckee River amid beautiful mountain scenery, heading for the quaint little town of Truckee, California. Known in days gone by

as a logging town, it is now an eclectic mixture of visitors (who ski in the winter and enjoy the sun in the summer) and unusual shops that beckon those searching for the unusual. After a tour of this historic town, we will go on to Squaw Valley and the Olympic village—you can still see the areas where the ski jumping and skating took place during the 1960 winter Olympics and view the Olympic flame, still burning. Then it's on to Tahoe City and Sunnyside Marina and restaurant on Lake Tahoe, for a delightful lunch. We will travel back through Tahoe City and visit the Boatworks mall. Making our way around the lake, viewing the changing fall colors and the snow-capped mountains, we will stop to take photos and smell the wonderful mountain air. The route back to the hotel will take us past ski areas, amid mountain pines and other evergreens. You won't want to miss this delightful, varied experience of the Tahoe area.

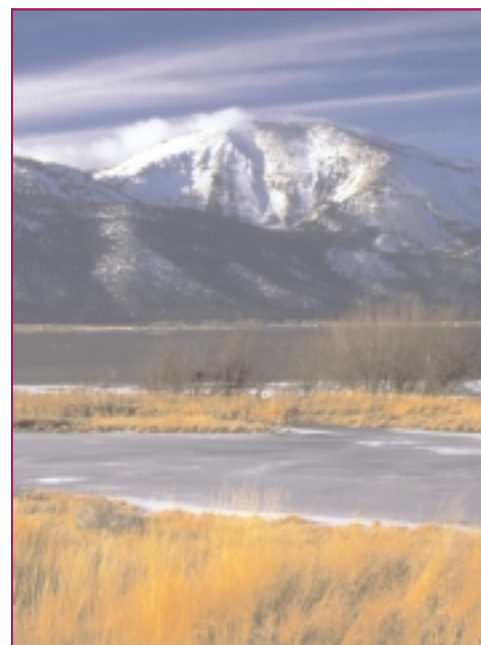
Cost: \$49 (includes transportation, lunch, admission fees, and all gratuities).

▲ The Other Side of Reno

Sunday, November 12, 9:00 a.m. –1:00 p.m.

Walter Van Tilburg Clark called Reno "The City of Trembling Leaves." Clark Gable and Marilyn Monroe chose Reno as the appropriate place to film *The Misfits*, and Whoopi Goldberg fit right in as a nun dodging the bad guys as they chased her through a Reno casino. But the "biggest little city in the world" is more than casinos and hotels and movie locations—Reno has charming older homes, art galleries, and educational and cultural spots. We begin our tour by visiting the gracious old neighborhoods and the University of Nevada, and then go on to some small boutique malls and art galleries. We will have a guided tour of the Wilbur May Museum and the National Automobile Museum, seldom seen by the average visitor to Reno.

Cost: \$32 (includes transportation and admission fees).



Washoe Lake and Carson Range, Washoe Lake State Park, Nevada. Photo by John A. Karachewski.

▲ Virginia City: A Boomtown Still Booming

Monday, November 13, and Tuesday, November 14, 10:00 a.m. –4:00 p.m.

In 1859, Pat McLaughlin and Peter O'Reilly discovered gold, and Henry Comstock conned them into thinking that the land they claimed was his ranch. So the three established a partnership—and the boom began. More than one billion dollars worth (by 1859 standards) of precious ore was taken from the ground in the boom years. At the peak of its glory, Virginia City was a boisterous town of over 30,000 and hosted live Shakespeare performances, newspapers, saloons, operas, and opium dens. Gold, silver, and conspicuous affluence abounded. Virginia City is much smaller now, but the flavor of the Comstock Lode days still remains along the boardwalk main street, with saloons like the Bucket of Blood and gift and antique shops, in the restored mansions, and on the mine tours and trolley rides around the town. Pipers Opera House, Chinatown, the cemetery with its unusual headstones—Virginia City is history atop a mountain. You will learn much of this history en route, and then you'll have time to browse along the boardwalk, perhaps to visit a restored mansion or learn why they call it the Suicide Table at the Delta Saloon. Virginia City is one of the largest historic landmarks in the country.

Cost: \$35 (includes transportation and lunch).

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▲ Carson City—Basque Country Tour and Lunch

Wednesday, November 15, 9:30 a.m. – 3:30 p.m.

At the beginning of the 19th century, many parties of explorers arrived in Nevada. Their reports of extreme hardship discouraged others from attempting to settle until the lure of silver and gold overcame the fears of the prospectors. The farmers and ranchers arrived in the 1850s, and among the most successful of the homesteaders were the Basque people of the Spanish and French Pyrenees. They brought with them respect for the land, a tradition of hard work, and a cultural heritage that continues to influence Nevada to this day. We will begin with a driving tour along Franktown Road, seeing some fantastic ranch-style homes at the foot of the mountains, and then go on into Carson City, where we will see the old mansions as well as the Governor's Mansion. At the Nevada State Museum, we will learn some of the history of this battle-born state and the silver kings who dominated it. We will travel up Spooner Summit, follow the rim of Lake Tahoe, and then drop down the Kingsbury Grade through Genoa, the oldest settlement in Nevada, to the little farming town of Gardnerville, where we will visit the Basque Country Club for a family-style Basque lunch. We will return to Reno by way of Washoe Valley.

Cost: \$45 (includes transportation, admission fees, hearty Basque meal, and all gratuities).

▲ Paddlewheel Cruise—Lake Tahoe Shoreline

Sunday, November 12, 9:00 a.m.–3:00 p.m., and Wednesday, November 15, 10:00 a.m.–4:00 p.m.

This tour begins with an escorted, narrated ride to Lake Tahoe, where we will board the new M.S. *Dixie* for a cruise on the crystal-clear waters of Lake Tahoe. We will enjoy the picturesque shoreline of Tahoe and see Emerald Bay, Vikingsholm Castle, Rubicon Point, and the shoreline homes and golf courses. The captain will entertain us with interesting Lake Tahoe stories during the cruise, and we will enjoy a leisurely lunch. On the trip back to Reno, we will pass the Ponderosa Ranch and go down Mt. Rose, where we will see more fabulous alpine scenery.

Cost: \$42 (includes transportation, paddlewheel cruise, lunch, and all gratuities).

▲ Art Galleries, Antiques, and Champagne

Tuesday, November 14, 1:00–5:00 p.m.

This will be a city-wide quest for the best of Reno—the most interesting art galleries, the unique antique shops, an artist's studio. The day will begin with a private tour of the studio of a potter, weaver, painter, or photographer, where we will have the opportunity to purchase an original work of art. The next visit along this artistic trail will be to an antique shop, where we will find some prize collectibles with a western flair. We will go on to a boutique mall filled with a variety of delightful little shops, as well as the finest nursery and flower shop in Reno, Arlington Gardens. The day will end with a visit to the River Gallery in downtown Reno, where we can find art objects, gifts, pottery, and sculpture. We will be treated to a glass of kir royale (champagne and crème de cassis) and dessert.

Cost: \$31 (includes transportation, gallery and antique store stops, dessert, and champagne).

▲ Guest Hospitality Room

Beginning Sunday, November 12, guests are invited to visit the Hospitality Room located at the Reno Hilton or Reno/Sparks Convention Center. Your local hosts will provide a resource center with abundant information on Reno and the surrounding areas. Information on scheduled tours as well as places to go on your own will be available. Light refreshments will be served throughout the day. Remember to wear your GSA badge; it will be required for admission to the Hospitality Room and the Exhibit Hall. Guest registration does not include access to the technical sessions; however, a guest can obtain a temporary pass to see a spouse or friend present a paper.

Guest Hospitality Room Hours

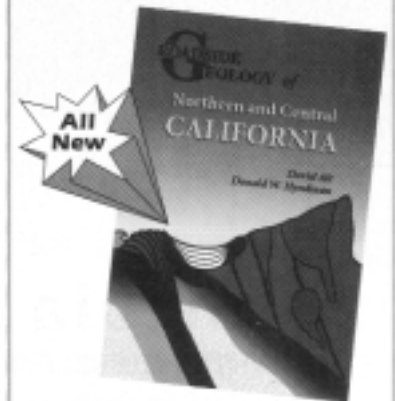
Sunday	8:00 a.m.–5:30 p.m.
Monday	8:00 a.m.–5:30 p.m.
Tuesday	8:00 a.m.–5:30 p.m.
Wednesday	8:00 a.m.–5:30 p.m.
Thursday	8:00 a.m.–12:00 noon

Seminars

Payment of the guest registration fee entitles you to attend seminars that will be offered in the Guest Hospitality Room. Please see the *2000 Annual Meeting Program* for more information on titles and times of the seminars.

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 Sunday: 5–7:30 p.m.
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Coming Attractions

Get the latest word on GSA Boston – 2001.
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SPECIAL EVENTS

GSA Presidential Address and Awards Ceremony

New day and time: Sunday, November 12, 3:00–5:00 p.m.

Save 3:00–5:00 p.m. Sunday for GSA President Mary Lou Zoback's address, *Grand Challenges in Earth and Environmental Science—Science, Stewardship, and Service for the 21st Century*, and the 2000 Annual Meeting Awards Ceremony.

Awardees for the Penrose Medal, the Day Medal, the Young Scientist Award (Donath Medal), the Public Service Award, and the Distinguished Service Award, as well as the newly elected Honorary Fellows, will be announced in the July issue of *GSA Today*.

Hear Mary Lou Zoback's address and honor your fellow geoscientists, the awardees and Honorary Fellows, at the Presidential Address and Awards Ceremony before heading for the Welcoming Party (5:00–7:30 p.m.) in the same building—the Reno/Sparks Convention Center.

Premeeting Dinner and Show

Saturday, November 11, 5:00 p.m., El Dorado Hotel.

Enjoy *Spirit of the Dance*, a wonderful show featuring 24 Irish dancers. \$45 per person.

Awards Luncheons and Other Ticketed Group Functions

Associated societies and GSA divisions invite their members and other interested guests to join them for their annual meal functions, special addresses, and awards ceremonies. Only a few tickets will be available on-site, so please register early for ticketed functions using the preregistration form on page 51 (events 301–312). Check the preregistration form for dates. Location and time of events will appear on your ticket and in the *2000 Annual Meeting Program*.

Group Alumni Party—NEW TIME!

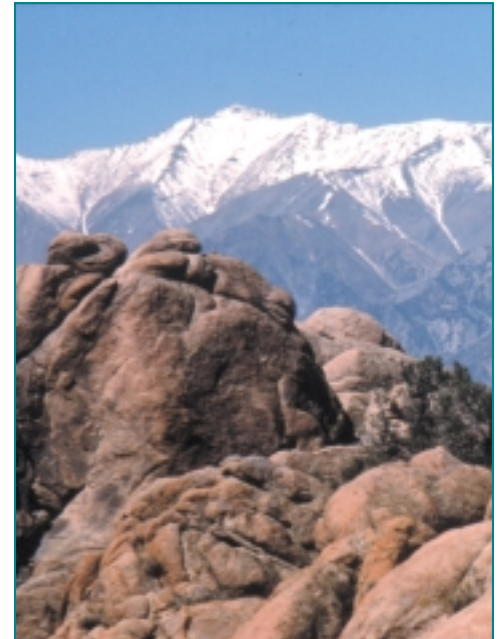
Monday, November 13, 5:30–7:30 p.m., Reno/Sparks Convention Center, Exhibit Hall.

Come join your former classmates and colleagues at this year's Group Alumni Party in the exhibit hall after the technical program on Monday. To include your school in the Group Alumni Party, go to www.geosociety.org and complete the Space Request Form, or contact Andrea Harshman at aharshman@geosociety.org or (303) 447-2020, ext. 158, for details.

Private Alumni Receptions

Monday, November 13, 7:30–10:00 p.m., Reno Hilton (other hotels if space necessitates).

Plan to join your fellow alumni for an evening of memories and renewed connec-



Northern White Mountains, California–Nevada border. Photo by Martin Miller.

tions. Please see the *2000 Annual Meeting Program* for a listing of schools holding individual alumni receptions and locations. If you would like to hold an alumni reception, check with your department head, who may have already arranged this with GSA, or send an email to aharshman@geosociety.org.



Sand Harbor, Lake Tahoe, Nevada State Park. Photo by John A. Karachewski.

TRAVEL

Air Travel

You have three ways to make your reservations:

1. Call the official GSA travel agency—Navigant International, 1-800-333-6338 or (303) 706-0570, or e-mail meetings@ptc.agencymail.com. (A \$20 transaction fee will be charged per ticket.) Say that you are traveling to the GSA Annual Meeting, and receive:
 - lowest available fares on any airline
 - discounts on United Airlines and American Airlines
 - car rental discounts at Alamo
 - frequent flyer miles and seat assignments
 - easy, ticketless travel on most carriers
2. Call the airline directly and ask for the following codes:
 - American Airlines, 800-433-1790, AN#10N0UK

- United Airlines, 800-521-4041, Tour Code 581HO

3. If using your own travel agency, refer to the Tour Code number above when booking on United in order to receive the special discounts.

Car Rental

Alamo is the official car rental company for the meeting. To receive Alamo's special group rates, attendees must call the toll-free 24-hour reservation number, 1-800-732-3232 and request Group ID# 85204 and Rate Code GR. International attendees may fax reservation requests to 1 (561) 912-2601.

Discounts are on daily and weekly rates: Economy—\$30/\$130; compact—\$32/\$140; mid-size—\$34/\$155; full size—\$40/\$180; convertible—\$55/\$269; minivan—\$59/\$269; luxury—\$60/\$339. Rates include unlimited mileage and no charge for additional drivers. The Alamo counter is in the baggage claim area of the airport.



CONVENIENCE INFORMATION

Newsroom

Sunday through Thursday Reno/Sparks Convention Center

GSA provides a variety of media relations services before and during the annual meeting to encourage coverage of science that is of interest to the general public. Newsroom facilities are available for use by media representatives who come on-site, as well as public information officers (PIOs) from participating organizations. Members of the press and PIOs with appropriate credentials may request complimentary meeting registration by contacting Ann Cairns at GSA headquarters, acairns@geosociety.org.

The full-service Reno/Tahoe International Airport is conveniently located within 10 minutes of almost anywhere in the Reno/Sparks area. The ground transportation facility is in the main terminal, just outside of the baggage claim area.

GETTING TO YOUR HOTEL

Airport Shuttles—The Reno Hilton, Atlantis Casino Resort, and Peppermill Casino Hotel offer complimentary shuttle service to and from the airport. Hotel shuttles can be found outside of the baggage claim area.

Taxicabs—Approximate cost from the airport to major hotels is less than \$10 for one person.

GETTING AROUND IN RENO

GSA Shuttle—Free shuttle service between GSA hotels and the Reno/Sparks Convention Center.

Taxicabs—Service to downtown Reno from the convention center and all major hotels is *approximately* \$10.

CHILD CARE

For child care recommendations, please contact the Reno Hilton at (775) 789-2000.

ACCESSIBILITY FOR REGISTRANTS WITH SPECIAL NEEDS



GSA is committed to making the Annual Meeting accessible to all people interested in attending. If you need auxiliary aids or services because of a disability, check the appropriate box on the registration form. If you have suggestions or need further information, contact Andrea Harshman, GSA headquarters, (303) 447-2020, ext. 158, or aharshman@geosociety.org. Please let us know your needs by October 6.

TOURIST INFO

For information on Reno, contact the Reno/Sparks Convention & Visitors Authority, P.O. Box 837, Reno, NV 89504-0837, (800) 367-7366 or visit their Web site at www.renolaketahoe.com.

WEATHER AND CLIMATE

Because of variation in altitude and geography, Reno/Sparks-Lake Tahoe climate varies by location within the area. The overall climate is arid, ensuring comfortable temperatures year-round. The average high temperature in Reno during November is 56°F and the average low is 24°F.

Geologists say earthquake response by U.S. hampered

FRONT PAGE

Geologists: Developed flood plain left hurricane rains nowhere to go

Sharpen Your
Media Skills

Media Relations Workshop

Sunday,
November 12, 2000

Watch for details in
GSA Today
& on the GSA Web site
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NASA assembling team to set criteria for proving Martian life
Scientists warm up to 'Snowball Earth'

Space station's low orbit to give geologists a sharp eye in the sky

ATTENTION, STUDENTS!

President's Student Breakfast Reception

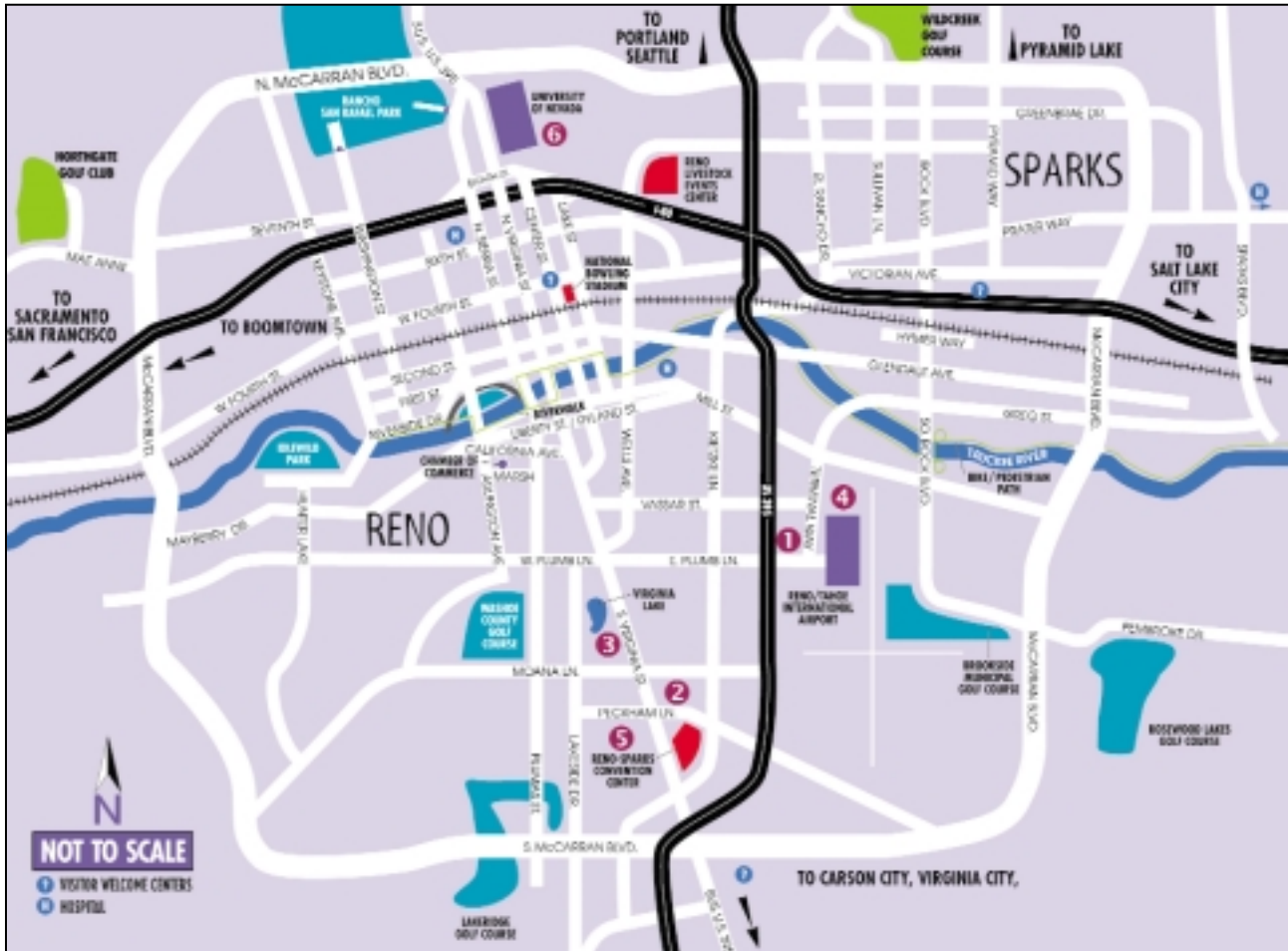
Monday, November 13,
7:30 to 8:30 a.m.

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GSA President Mary Lou Zoback invites all students registered for the meeting to attend a free breakfast buffet sponsored by ExxonMobil Corporation. Mary Lou and members of the GSA leadership, as well as ExxonMobil staff members, will be on hand to answer questions and address student issues. Registered students will receive complimentary coupons redeemable toward the breakfast buffet and will be eligible for prize drawings. Take this opportunity to network with fellow students and meet the officers of GSA!



- 1 Reno Hilton
- 2 Atlantis Casino Resort
- 3 Peppermill Hotel Casino
- 4 Reno/Tahoe International Airport
- 5 Reno–Sparks Convention Center
- 6 University of Nevada, Reno

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Hotel	Distance to CC	Rates Single/Double	Comments
1. Reno Hilton 2500 East Second Street Reno, NV 89595 (Headquarters hotel)	3 miles	\$85/\$85	Eight restaurants, health club and spa, 5 indoor and 3 lighted outdoor tennis courts, full-service water driving range, 50-lane bowling center, 2-screen movie theater, 25 specialty shops, family fun center, complimentary airport shuttle
2. Atlantis Casino Resort 3800 South Virginia Street Reno, NV 89502	2 blocks	\$64/\$64 \$54 student rate	Seven restaurants, complimentary full service health club, indoor and outdoor pools, styling salon and massage therapy available, 24-hour room service, voice mail, dataport connections, on-demand movies, complimentary airport shuttle
3. Peppermill Hotel Casino 2707 South Virginia Street Reno, NV 89502	1 mile	\$64/\$64 \$54 student rate	1200-room hotel offering year-round heated pool, complimentary health club, free valet and self-parking, six restaurants, concierge, styling salon, adjacent to tennis, golf, shopping, and theaters. Rooms feature stunning view, voice mail, modems available, mini bars, hairdryers, irons, radios, and more. Complimentary airport shuttle.



HOUSING

HOUSING

The Reno Hilton will serve as the headquarter's hotel and will host business meetings, social events, and workshops. Field trips will depart from the Reno Hilton. Short courses and workshops will also be held there.

Three hotels will be offering a special GSA convention rate. Please make reservations early to ensure that there is room at your preferred hotel. See the hotel grid on page 47 for specific information and pricing on each hotel.

MAKING A RESERVATION

Please print or type all information on the housing form located on page 49. Mail or fax the form to the GSA Housing Bureau. Check all information for accuracy before sending. List your hotels in order of preference. If your selected hotel is not available, the Housing Bureau will select a hotel on

the basis of your specified criteria. For best result, return your form early. **THE RESERVATION CUT-OFF DATE IS OCTOBER 6, 2000.** The GSA convention rate cannot be guaranteed after this date.

You will receive an acknowledgment from the Housing Bureau with your hotel assignment within seven to ten days of receipt of the housing form. **The Housing Bureau will not accept reservations by telephone.** If you have not received acknowledgment within ten days or need to cancel or change a reservation before October 6, call the Housing Bureau at (800) 367-7366, press 2, then dial ext. 7714, 7 a.m.-6 p.m. Pacific time, or e-mail message to housing@rscva.com. Changes to arrival or departure dates, name changes, and cancellations after October 6 must be made directly with the hotel. Please see your hotel confirmation for individual hotel cancellation and deposit refund policies.

ROOM DEPOSITS

All reservations require a one-night room and 12% tax deposit. The hotel will charge your credit card for the deposit or you must send a check directly to the hotel upon receipt of the official housing acknowledgment. Please read the hotel confirmation carefully; it will state the cancellation and refund policy. **Do not send deposit checks to the Housing Bureau.**

STUDENT HOUSING

The Atlantis Casino Resort and the Peppermill Casino Hotel are offering a special student rate for the motor lodge rooms at the Atlantis and the annex rooms at the Peppermill. Student-rate rooms are limited. The rate is \$54.00 per night, single or double occupancy.

A student ID must be presented at check-in to receive this rate.

ABSTRACTS WITH PROGRAMS

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2000, Volume 32, Number 7

PRICE: \$35 net each for GSA members, \$38.75 net each for nonmembers.

If you reside in the United States, Canada, or Mexico, you may take advantage of the advance-copy purchase option of the Annual Meeting *Abstracts with Programs*. Due to the prohibitive airmail costs and delays for overseas mailings, we regret that

we cannot make this offer to everyone.

Copies will be mailed about three weeks prior to the meeting. Price includes shipment by first-class mail. No additional discounts may be applied to this offer.

The volume will also be for sale at the meeting. Please check to make sure that you have not already purchased a copy on your membership dues statement or through GSA Publication Sales. No refunds will be given for duplicate orders.

To Place Your Order

Prepayment is required. Check, money order (in U.S. funds, payable on U.S. banks), or major credit cards are accepted. Order directly from GSA Publication Sales by mail, phone, or fax. To assure receipt prior to the meeting, all orders must be received by October 1.

By mail or fax, use the form provided. By phone, call toll-free 1-888-443-4472, or use our business phone (303) 447-2020, ext. 774 during office hours (8 a.m. to 4:30 p.m. MT). On the GSA Web site, www.geosociety.org.

On-Site Purchase

Copies of *Abstracts with Programs* will be for sale in the registration area, and the GSA Bookstore.

Note: Your registration does not include a copy of the *Abstracts with Programs* volume.

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SEND TO: GSA Publication Sales, P.O. Box 9140, Boulder, CO 80301-9140

1-888-443-4472, (303) 447-2020, ext. 774, fax 303-443-1510

Orders must be received by October 1.

HOUSING FORM

GSA Annual Meeting, November 9–18, 2000

MAIL TO: Reno GSA Housing Bureau
P.O. Box 837
Reno, NV 89504

or Fax: 775-827-7713
Highly Recommended

**HOUSING DEADLINE:
FRIDAY, OCTOBER 6, 2000**

(NO TELEPHONE RESERVATIONS WILL BE ACCEPTED.)

Please do not duplicate your reservation by faxing and mailing this form. Print or type all information. Please read all hotel information prior to filling out this form. Reservations are processed on a first-come, first-served basis. Please submit one room request per form. If more than one form is required, this form may be photocopied. Acknowledgments will be sent by fax, mail, or e-mail. Be sure to keep a copy for your records.

Please send acknowledgment by fax mail e-mail
(acknowledgments faxed between 7 a.m. and 3 p.m., Pacific Time)

First Name _____ M.I. _____ Last Name _____

Company Name _____

Mailing Address _____

City/State _____ ZIP Code _____ Country: _____

Area Code _____ Daytime Phone Number _____ Fax _____ E-mail _____

Arrival Date: _____ Arrival Time: _____ a.m./p.m.

Departure Date: _____

HOTEL PREFERENCE: (Please see grid on page 47 for hotel information.)

- Reno Hilton
- Atlantis Casino Resort
- Peppermill Hotel Casino

If hotel requested above is unavailable, please process my reservation form according to:

- Comparable Room Rate
- Proximity to Convention Center

TYPE OF ACCOMMODATION: (Please check required room type.)

- Single (1 bed, 1 person)
 - Double (1 bed, 2 people)
 - Double/Double (2 beds, 2 or more people)
 - Triple (3 people, 2 dbl. beds)
 - Quad (4 people, 2 dbl. beds)
- Check here for student rate.
(Indicate room type at left.)

SPECIAL NEEDS:

- Nonsmoking room
- Smoking room
- Special needs (please list) _____

PLACE RESERVATION IN NAME OF: _____
First name Last Name

Name all other occupants:

Share with: _____

Share with: _____

Share with: _____

CREDIT CARD INFORMATION FOR HOTEL:

- American Express
- VISA
- Mastercard
- Diners Club

Card No. _____ Exp. date _____

Print name as it appears on card _____

Authorized Signature _____

RESERVATION DEPOSIT:

All reservations require a deposit equal to one night's stay plus 12% tax. The hotel will charge your credit card based on information provided above or you may send a check directly to the hotel upon receipt of official housing acknowledgment. If deposit is not sent, your reservation will be canceled. The hotel confirmation will state the cancellation/refund policy; please read this carefully. **DO NOT SEND DEPOSIT CHECKS TO HOUSING BUREAU.**

**Technical Program:
November 13–16**

Premeeeting Field Trips:
November 9–12

Short Courses & Workshops:
November 11–12

Presidential Address and
Awards Ceremony:
November 12

Exhibits Open:
November 12–15

Postmeeting Field Trips:
November 16–18



REGISTRATION

ONLINE REGISTRATION NOW AVAILABLE at www.geosociety.org.

Go to Summit 2000, then to Registration.

BY MAIL:

GSA Annual Meeting, P.O. Box 9140, Boulder, CO 80301-9140.

BY FAX (available 24 hours):

303-447-1510 or 303-447-0648.

Credit card use only.

Please do not send another copy in the mail.

All registration forms received at GSA by October 6 will be processed and badges mailed two weeks before the meeting. International badges must be picked up on-site.

GSA and ASSOCIATED SOCIETY MEMBERS SAVE \$75 (professional) and \$30 (student) by preregistering.

NONMEMBERS SAVE an additional \$75 (professional) and \$30 (student) by joining GSA now. See section below on how to join.

Preregistration deadline:
October 6

Cancellation deadline:
October 13

The member fees apply to members of both GSA and Associated Societies (listed on the form).

Registrations will not be processed unless full payment is received. Unpaid purchase orders are NOT accepted as valid registration. The confirmation sent by GSA will be your only receipt. You should receive it within two weeks after your registration is submitted.

Badges are needed for access to ALL activities, 10:00 a.m. Sunday through 5:00 p.m. Thursday.

A *guest registration* fee is available for a nongeologist spouse or friend of a professional or student registrant and is required

for those attending guest activities and the exhibit hall. The guest registration fee will not provide technical session access. Any guest wishing to see a specific talk should come to the Guest Hospitality Room for a pass.

Students: A CURRENT student ID is required to obtain student rates. You will have to pay the professional fee unless you have the ID.

Please register only one professional or student per form, and retain a copy for yourself.

All registrations received after October 6 will be considered ON-SITE registrations and charged accordingly. Absolutely no registrations should be mailed or faxed after October 23. After this date we will handle registrations at the Convention Center during the registration hours listed below.

On-site fees for Short Courses are an additional \$30.

As a special consideration, GSA is offering a discount rate to our members who are 70 years of age and older. Please write your membership number in the space provided and be sure to bring a picture ID to ensure your discount.

Cancellations, Changes, and Refunds

All requests for additions, changes, and cancellations must be made in writing and received by October 13, 2000. Faxes are accepted. GSA will refund or credit preregistration fees for cancellations received in writing by October 13. NO REFUNDS WILL BE MADE ON CANCELLATION NOTICES RECEIVED AFTER THIS DATE. Refunds will be mailed from GSA after the meeting. Refunds for fees paid by credit card will be

credited according to the card number on the preregistration form. There will be NO refunds for on-site registration, *Abstracts with Programs*, and ticket sales.

On-Site Registration Schedule

Reno/Sparks Convention Center

Saturday, Nov. 11 7:00 a.m. to 4:30 p.m.

Sunday, Nov. 12 7:00 a.m. to 7:30 p.m.

Monday, Nov. 13 7:00 a.m. to 4:30 p.m.

Tuesday, Nov. 14 7:00 a.m. to 4:30 p.m.

Wednesday, Nov. 15 7:00 a.m. to 4:30 p.m.

Thursday, Nov. 16 7:00 a.m. to 11:00 a.m.

GSA Members Pay Less! Join Now!

If you are not yet a GSA member, isn't it time to join? There are two ways to join and both save you money!

To take advantage of member benefits for the rest of 2000, join now, and pay the lower member registration rate for the meeting. Professionals and students who join GSA save a substantial amount on their registration fee by paying the member rate. *It's like joining GSA for free!*

To join, complete the application form available in the Member Services section on GSA's Web site at www.geosociety.org, or contact the Member Service Center at member@geosociety.org or 1-888-443-4472 or (303) 447-2020. It pays to be a GSA member!

If you pay the nonmember registration rate for the full meeting and complete your membership application at the meeting, you will receive a FREE membership for 2001. Just look for our Member Services booth at the meeting.

Registration Fees	Advance—by 10/6/00		After 10/6/00	
	Full Meeting	One Day	On-Site	One Day
Professional Member	\$260	\$160	\$335	\$160
Professional GSA Member (70 or older)	\$210	\$110	\$285	\$110
Professional Nonmember	\$335	\$186	\$410	\$186
Student Member or Associate Member	\$ 90	\$ 60	\$120	\$ 60
Student Nonmember	\$120	\$ 75	\$150	\$ 75
Guest or Spouse	\$ 80	N/A	\$ 80	N/A
K-12 Professional	\$ 40	N/A	\$ 40	N/A
Field Trip or Short Course Only	\$ 40	N/A	\$ 40	N/A

PREREGISTRATION FORM

GSA ANNUAL MEETING • RENO, NEVADA

RENO
November 9-18, 2000

Preregistration Deadline: October 6. Deadline for changes or cancellation is October 13.

Please print clearly • THIS AREA IS FOR YOUR BADGE

* Male Female

First Name/Nickname (as it should appear on badge) _____ Last Name _____
 Employer/University (affiliation as it should appear on badge) _____

Mailing address Is this a permanent address? Yes No Is this home or work

City _____ State or Province _____ ZIP or Postal Code _____ Country _____

E-mail _____ Business Phone _____ Fax _____ Home Phone _____

Spouse/Guest First Name/Nickname (as it should appear on badge) _____ Last Name _____ * Male Female

* Needed for field trip lodging.

Do you or your guest require any special considerations? Yes No

Will you be working in the exhibit hall? Yes No

For CEU credit — Social Security # _____

Preregistration Fees (US\$)	Full Meeting	One Day	Qty	US\$ Amt.
Professional Member*	(10) \$260	(11) \$160	1	\$
Professional Member 70 & Older	(12) \$210	(13) \$110	1	\$
Professional Nonmember	(14) \$335	(15) \$186	1	\$
Student Member or Associate Member*	(30) \$ 90	(31) \$ 60	1	\$
Student Nonmember	(32) \$120	(33) \$ 75	1	\$
Guest or Spouse**	(90) \$ 80	N/A	1	\$
K-12 Professional	(60) \$ 40	N/A	1	\$
Short Course or Field Trip Only	(95) \$ 40	N/A	1	\$

Check member affiliation(s) (to qualify for registration member discount): (a) GSA Mbr # _____
 (b) AASG (c) AASP (d) AEG (e) AESE (f) AGID (g) AIPG (h) AWG
 (i) CF (j) CUR (k) GIS (l) GS (m) HESS (n) MSA (o) NABGG
 (p) NAGT (q) NESTA (r) NGWA (s) PRI (t) PS (u) SEG (v) SEPM
 (w) SGE (x) SVP

*Member fee applies to any current Professional OR Student Member of GSA or Associated Societies listed above. Discount does not apply to guest registrants.
 **Guest or Spouse registration fee does not allow access to technical sessions.

FAX TO: 303-443-1510 or 303-447-0648
MAIL TO: GSA ANNUAL MEETING,
P.O. BOX 9140
BOULDER, CO 80301-9140

Remit in U.S. funds payable to 2000 GSA Annual Meeting
 (All preregistrations must be prepaid. Purchase Orders not accepted.)

Payment by (check one): Check # _____ American Express VISA MasterCard
 Discover Diners Club

Card Number _____ Expires _____
 Signature _____

Column C

SHORT COURSES (p. 32)	Qty	Amount
1. Fluid Flow in Fault and Fracture Zones		
Professional Student	(501)	\$470
Student	(501)	\$450
2. Digital Mapping Systems		
Professional Student	(502)	\$470
Student	(502)	\$450
3. Science of Earthquakes		
Professional Student	(503)	\$370
Student	(503)	\$350
4. Environmental Isotopes in Groundwater		
Professional Student	(504)	\$340
Student	(504)	\$320
5. Spatial Variations in Hydraulic Conductivity		
Professional Student	(505)	\$350
Student	(505)	\$330
6. Mobilization of Metals from Fossil Fuels		
Professional Student	(506)	\$230
Student	(506)	\$210
7. Methods in Applied Contaminant Geochemistry		
Professional Student	(507)	\$300
Student	(507)	\$280
8. GIS for the Geosciences		
Professional Student	(508)	\$370
Student	(508)	\$350
IEE-SPONSORED EVENTS (p. 27)		
1. Geology on Public Lands	(550)	\$35
2. Geology in Government Mentor Program	(552)	Free
K-16 WORKSHOPS (p. 35)		
1. MAGT: Innovative Course Design	(601)	\$30
2. Evolution: Investigating the Evidence	(602)	\$30
3. Fun with Planetary Geology	(603)	\$20
4. GIS: Beginner to Intermediate ArcView	(604)	\$20
5. This Dynamic Planet	(605)	\$5
6. Inquiry Learning in Plate Tectonics	(606)	\$15
7. Dr. Art's Guide to Planet Earth	(607)	\$30
8. Exploring Plate Tectonics	(608)	\$25
9. MAGT: Effective Lab Exercises	(609)	\$30
10. MAGT: Preparing to Teach	(610)	\$25
11. Hands-On GIS—Int. to Adv.	(611)	\$20
12. Undergrad. Research Program	(612)	\$20
13. Linking Science and Art	(613)	\$30
14. Integrating GIS into Curriculum	(614)	\$20
Total Column C		\$
Total Column B		\$
Total Column A		\$
TOTAL FEES REMITTED		\$

Column B

GUEST ACTIVITIES (p. 42)	Qty	Amount
1. Birding, Great Basin, Sun.	(101)	\$28
2. Other Side of Reno, Sun.	(102)	\$32
3. Paddlewheel Cruise, Sun.	(103)	\$42
4. Lake Tahoe-Truckee, Mon.	(104)	\$49
5. Virginia City, Mon.	(105)	\$35
6. Virginia City, Tue.	(106)	\$35
7. Lake Tahoe-Truckee, Tue.	(107)	\$49
8. Galleries, Antiques & Champ, Tue.	(108)	\$31
9. Carson City, Basque Country, Wed.	(109)	\$45
10. Paddlewheel Cruise, Wed.	(110)	\$42
SPECIAL EVENTS (p. 45)		
1. Spirit of the Dance	(201)	\$45
TICKETED GROUP FUNCTIONS		
1. G&PP Breakfast, Sun.	(301)	\$17
2. MAGT & Geosci. Ed. Div. Lunch, Mon.	(302)	\$26
3. AWG Breakfast, Tue.	(303)	\$17
4. History Geology Div. Lunch, Tue.	(304)	\$26
5. Hydrogeology Div. Lunch, Tue.	(305)	\$26
6. MSA Lunch, Tue.	(306)	\$26
7. Paleontological Society Lunch, Tue.	(307)	\$26
8. SEG Lunch, Tue.	(308)	\$26
9. GIS Lunch, Tue.	(309)	\$26
10. MSA/GS Recept., Prof., Tue.	(310)	\$10
11. MSA/GS Recept., Student, Tue.	(311)	\$5
12. Engineering Geology Div. Lunch, Wed.	(312)	\$26
FIELD TRIPS (p. 29)		
1. Sierra Nevada Block	(401)	\$520
2. Neoproterozoic Glacial Record	(402)	\$340
3. White-Inyo Range, California	(403)	\$265
4. Yucca Mountain Site	(404)	\$220
5. Stratigraphy, Structure, Central Nevada	(405)	\$300
6. Neogene-Quaternary Hillslope Records	(406)	\$250
7. Paleozoic Roof Pendants	(407)	\$210
8. Paleozoic Subduction Complex	(408)	\$265
9. Truckee River & Pyramid Lake	(409)	\$75
10. Geomorphology, Carson Desert	(410)	\$70
11. Verdi Basin	(411)	\$70
12. Lake Tahoe Active Faults	(412)	\$70
13. Mid-Mesozoic Plutonism, Deformation	(413)	\$285
14. Pre-Tertiary, Nevada Test Site	(414)	\$230
15. Global Ordovician Boundaries	(415)	\$295
16. Late Cenozoic Crustal Extension	(416)	\$340
17. Lake Tecopa and Its Environs	(417)	\$95
18. Pershing Carbonate Olistostrome	(418)	\$80
19. Hydrology of Tahoe Basin	(419)	\$225
20. Earthquakes, Surface Faulting	(420)	\$345
21. Eocene Magmatism of NE Nev.	(421)	\$260
Total Column B		\$

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EXPAND

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WHERE: The on-site meeting PROGRAM. The meeting bible for attendees.

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HOW: Contact GSA Advertising Coordinator, Ann Crawford: 1-800-472-1988 x153;
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Exhibitor Advertisers: Receive a 10% discount on space rates for the Program. Frequency discounts apply. Special offer for booking in the October issue of *GSA Today* as well!

International Subcommittee on Stratigraphic Classification of IUGS International Commission on Stratigraphy

International Stratigraphic Guide—An Abridged Version

Edited by Michael A. Murphy and Amos Salvador

Covered Reprint

***Episodes*, December 1999
Volume 22, No. 4, p. 255–271**

The second edition of the *International Stratigraphic Guide* (1994) made a significant contribution to international agreement on the principles of stratigraphic classification, terminology, and procedure, and to improve communication and understanding of these principles worldwide.

The publication of this abridged version attempts to bring this information to stratigraphers and students of stratigraphy from around the world who have had difficulty obtaining the full *Guide* because of cost or unavailability.

The abridged version is not a revision of the substance of the *Guide*; all essential tenets of the full second edition concerning stratigraphic classification, terminology, and procedure have been retained. The same organizational framework has been maintained so that users can readily refer to the full version for more complete information.

The principal victims of the abridgement have been some explanatory text, examples of stratigraphic procedures, the Glossary of Stratigraphic Terms, the List of National or Regional Stratigraphic Codes, and the extensive Bibliography of Stratigraphic Classification, Terminology, and Procedure.

Order now!

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