ABSTRACT

The Yellowstone hotspot commonly is thought to result from a stationary mantle plume rooted in the lower mantle over which North America moves. Yet Yellowstone's initiation and its association with the “backward” propagating Newberry hotspot across eastern Oregon pose difficult questions to those explaining Yellowstone as a simple consequence of a deep-seated plume. Teleseismic investigations across the Yellowstone topographic swell reveal: (1) the swell is held up by buoyant mantle of two types—partially molten mantle (of low seismic velocity) beneath the hotspot track and basalt-depleted mantle (of high velocity) beneath the rest of the swell; (2) an upwarped 660 km discontinuity beneath the Yellowstone hotspot track, as expected for relatively hot mantle at that depth, and an upwarped 410 km discontinuity, indicative of relatively cool mantle at this depth; and (3) anisotropic mantle with a preferred northeast orientation of olivine a-axis, consistent with the strain expected for both plate motion and hotspot asthenosphere flow. Imaged mantle velocities can be reconciled with a plume hypothesis only if melt buoyancy within the hotspot asthenosphere drives convection, with melt segregating from the mantle beneath Yellowstone and residuum being deposited adjacent to the upwelling. Once such convection is admitted, an alternative, nonplume explanation for Yellowstone is possible, which has propagating convective rolls organized by the sense of shear across the asthenosphere. This explanation has the appeal that expected asthenospheric shear beneath the northwest United States predicts both the Yellowstone and Newberry hotspots with a single (upper mantle) process.

INTRODUCTION

Recent teleseismic studies of the upper mantle beneath the Yellowstone swell provide insight on the origin of hotspots. The upper mantle beneath this swell now is one of the most seismically resolved regions on Earth, and the physical state of the upper mantle is accordingly well understood. However, interpretation of our findings in terms of hotspot processes remains ambiguous. Where once a plume origin seemed natural, we now consider a nonplume explanation to be at least as attractive. Studies currently collecting teleseismic data in the greater Yellowstone area should answer most questions currently deemed important about this hotspot.

Hotspots are defined by their anomalous surface manifestations, in particular, the time-transgressive propagation of volcanism over hundreds of kilometers, often

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Beneath Yellowstone: Evaluating Plume and Nonplume Models Using Teleseismic Images of the Upper Mantle

Discussion
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Calendar

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with geothermically distinct lavas. Because of their inferred association with Earth’s “stable interior,” hotspots have played an important role in plate tectonic theory (e.g., Morgan, 1971). Also, their presumed role as the actively ascending part of mantle convection (e.g., Davies, 1993), arising from a lowermost mantle thermal boundary layer (e.g., the core-mantle boundary or a boundary in the lower mantle [Kellogg et al., 1999]), gives hotspots special geodynamic significance.

A mantle plume origin of hotspots is widely accepted, on the basis of the relative fixedness of hotspots, the need for an anomalous heat source, and elevated 3He/4He values thought to represent long-isolated “primordial” mantle (e.g., Kellog and Wasserburg, 1990). These observations combine to support the simple and elegant model well known to earth scientists: Conduits rooted deep in the stable lower mantle supply relatively undepleted mantle that feeds the surface expressions of hotspots. In this model, hotspot magmatic activity begins with the impact of a large plume-fed head of hotspot mantle, to which many flood basalts are attributed (Duncan and Richards, 1991), and is followed by supply from the conduit, which constructs a hotspot track leading away from the site of basal flooding with plate motion. However, the actual deep structure of hotspots, and therefore the actual processes underlying their behavior, are not well understood. Furthermore, an apparent absence of uplift prior to head
A Year of Accomplishment and Learning

"I personally measure success in terms of the contributions an individual makes to her or his fellow human beings."

Margaret Mead

My first full year as CEO of GSA has been filled with success and learning—for myself, for GSA Headquarters staff members, and for our elected Councilors and Officers. I want to review what we’ve accomplished this year, share results of goals set forth in my December 1999 Dialogue column, and share some new goals and expectations for the next 12 months and beyond.

New Business Processes

GSA headquarters continues to evolve toward being a function-based organization, where the form of the organization follows the function of the projects we do for GSA members and the broader geoscience community. Staff efforts are focused in three key areas: providing programs, providing services, and creating products. Efforts in these areas are shaped by goals set forth in GSA’s strategic plan.

The focal point of all programs, services, and products is science. That’s why the chief science officer (CSO), whose role is to provide integration of these areas, shares leadership with the chief executive officer, whose role is to ensure that fiscal and human resources are available to accomplish the GSA vision.

CSO Cathleen May notes, “Headquarters’ function is centered on supporting science and the value of science by and for GSA members. The changes in structure allow effective integration of functions within the system. On the staff side, the dedicated professionals at headquarters can work more directly and collaboratively on things that add meaning to their working lives.”

Fiscal year 2000 was the first to utilize GSA’s new budgeting process. It involves coordinated management of three separate budgets: an operating budget for core programs, services, and products; a strategic budget for new initiatives derived from the strategic plan; and a capital budget for maintaining GSA facilities. This fiscal year, all three will come in at or under projected costs.

This new budgeting process allows for significant participation by GSA’s elected leaders in reviewing and prioritizing projects in the strategic budget. The Programmatic Overview Committee (POC) reviewed nine business plans this year, ranging from electronic publishing to globalization. A total of $1.275 million is set aside for strategic spending over the next 18 months.

A change in GSA’s fiscal year in 2001–2002 from a calendar year to a 12-month year that begins July 1 will concentrate revenue-generating activities in the first two quarters. Should we miss our projected revenues, we would then have two additional quarters to make adjustments.

Strategic Partnerships

Expanding our external focus, we initiated a partnership with The Geological Society (London). Our first joint activity, a global meeting in Edinburgh, Scotland, is scheduled for June 2001. The theme of this meeting is Earth System Processes, emphasizing the integrated nature of our science and the need for enhanced collaboration between geoscience disciplines and the related sciences we use to interpret earth system problems. Ian Fairchild and Ian Dalziel have set a unique technical program for this meeting, which you can see in the November issue of GSA Today or on the Web at www.geosociety.org.

In July we began discussions with the Geological Society of Australia on joint publications and a second global meeting in 2003.

GSA holds a unique position within the geoscience community. We have an imperative to expand our external focus and use our fiscal strength to pursue our collective vision for the geosciences. It has been a great year at GSA, with successful projects and new ventures. We couldn’t have achieved these successes without the dedication, contribution, and sacrifice of GSA staff, and I thank each one of them. I’m looking forward to the year ahead, and wish you all a safe and prosperous new year.

impact and the unusual circumstances under which hotspot magmatism often initiates (e.g., Anderson, 1999; Czamanske et al., 1998) are difficult to incorporate into a plume model. As a result, alternative hotspot hypotheses have been suggested with an upper mantle origin (e.g., Anderson, 1999) or a dominance of upper-mantle processes (Saltzer and Humphreys, 1997).

Of the hotspots investigated seismically, Iceland and Yellowstone are the two most thoroughly studied. A plume origin is argued for Iceland based on tomograms of the upper mantle (Wolfe et al., 1997) and imaged deflection of the temperature-sensitive 410 km and 660 km seismic discontinuities (Shen et al., 1998). However suggestive, an absence of seismic information from adjoining regions near Iceland provides little context in which to interpret the imaged structures. The Yellowstone hotspot offers the advantage of broad accessibility compared to oceanic hotspots, but teleseismic arrivals travel through the relatively complicated continental crust. The resulting tradeoff is that, compared with oceanic hotspots, the geometry of the ray set is superior for deep and regional imaging, but the data are degraded by greater amounts of crust-generated noise.

In most ways, Yellowstone is a typical hotspot. Figure 1 shows the Yellowstone-Newberry volcanic-tectonic system in the context of the western United States. Yellowstone is characterized by a magmatic track and a southwest-widening topographic swell left in the wake of the northeast-propagating (relative to North America) hotspot. The topographic swell is thought to result from plume flattening beneath the southwest-moving lithosphere (Anders and Sleep, 1992), as conceptualized in Figure 2. The swell’s margins have been termed the “seismic parabola” (Anders et al., 1989) for their seismicity (see Fig. 3). The magmatic track is the eastern Snake River Plain, which trends near the symmetry axis of the swell; it is a topographic depression because basaltic intrusions have loaded the crust, causing subsidence (Anders and Sleep, 1992). For Yellowstone, as for some other hotspots, relatively high $^3$He/$^4$He values (Hearn et al., 1990) are thought by Beneath Yellowstone continued on p. 4
Interpretation of seismological data is key to understanding the internal structure of the Earth and the processes that shape the planet. In particular, the study of crustal and mantle discontinuities provides crucial insights into the dynamics of hotspots and the nature of the mantle sources driving them. In this section, we focus on the Yellowstone hotspot, which is characterized by a distinct seismic signature indicating a complex interplay of mantle and crustal processes.

**Beneath Yellowstone continued from p. 3**

The Yellowstone hotspot is a fascinating example of a continental hotspot, and its study reveals a wealth of information about mantle plumes and their interaction with the crust. The hotspot is marked by a series of large volcanic eruptions, with Yellowstone National Park being the most recent and active manifestation.

**TELESEISMIC INVESTIGATION**

In teleseismic seismology, the distortion of seismic waves is analyzed to infer the structure of the upper mantle and crust through which the waves propagated as they arrive from distant earthquakes to an array of seismometers. To address the structure beneath the Yellowstone swell, we deployed a seismic array occupying ~50 sites in a line trending across the width of the swell (Figs. 1 and 3). Our work follows that of Evans (1982), who imaged upper mantle P-wave velocity structure by making use of traveltime delays of the first arriving waves recorded on 1 Hz vertical-motion seismometers. Our three-component broadband seismometers enabled receiver function imaging for crust and upper mantle interfaces, S-wave splitting analysis for upper mantle anisotropy, and P- and S-wave tomographic imaging of upper mantle velocity variations—methods now routine in teleseismic seismology.

**Receiver Function Imaging of Crustal and Mantle Interfaces**

A P wave partially converts to an S wave as it travels across an interface. At Earth’s surface, the time delay of the converted S wave relative to the (faster traveling) P wave is proportional to the depth of the interface, and the magnitude of the S wave depends on the seismic contrast of the interface. Using these principals, the receiver function technique was used to image crustal and upper mantle discontinuities beneath our array. Combined with previous reflection-refraction investigations (Sparlin et al., 1982), receiver function analysis allowed Peng and Humphreys (1998) to image the crustal structures shown in Fig. 3: (1) a mid-crustal basalt sill across the width of the Snake River Plain, (2) an ~5 km thick partially molten lowermost crust across the width of the plain, and (3) a Moho that is approximately flat across the width of the seismic parabola but which thickens rapidly southeast of the swell. P-wave velocities (from Sparlin et al., 1982) suggest that the basalt sill is about half basalt and half the granitic country rock that comprises the upper crust away from the eastern Snake River Plain. The ~10 km thickness of the basalt sill therefore implies ~5 km of basalt added to the upper crust across the width of the eastern plain, and the partially molten lower crust suggests an underplating of probably 5 or more km of gabbroic crust. This crustal inflation is not reflected by a greater Moho depth, suggesting that lower crust was squeezed from beneath the eastern Snake River Plain to adjoining regions.

Perhaps the most important result of crustal imaging is the information it provides to model crustal density structure, which allows us to calculate mantle buoyancy across the width of our array. Mantle buoyancy holds the swell about 1 km higher than would normal mantle (e.g., eastern U.S. seaboard mantle), whereas mantle southeast of the swell is of more normal density (Peng and Humphreys, 1998). The highly (and uniformly) buoyant mantle across the width of the swell and the isostatic balance of the crust above it are consistent with standard thoughts on hotspots (e.g., Fig. 2).
Yellowstone swell defines a coherent, simple, and distinctive upper mantle anisotropy domain. There are two reasonable ways to interpret the observed upper mantle anisotropy. In the first, buoyant mantle beneath the swell is simply sheared by North America as it moves over a more stable interior (causing the a axis of olivine to align preferentially in the direction of plate transport. Another possibility is that a plume supplies buoyant mantle at a high rate, and this buoyant mantle flows to the southwest accommodated by deformation in the previously deposited low-viscosity hotspot asthenosphere (see Fig. 2). In this model, the southwest orientation of the finite elongation direction results from mantle flow driven by the local pressure gradient, and not by passive shear driven by plate motion. The similarity of results from different processes highlights the difficulties in understanding the mechanisms responsible for the mantle structure.

**Tomographic Imaging of the Upper Mantle Velocity Variations**

Figure 3 shows an image of the upper mantle P-wave velocity structure (Saltzer and Humphreys, 1997). Red and blue areas represent areas where waves propagate relatively slowly (red) and quickly (blue). The blue areas have a seismic velocity that is about average for mantle beneath continents. The low-velocity anomaly is about as wide as the Snake River Plain, and is much narrower than the swell. The prominence of the relatively high-velocity mantle beneath the high-standing swell seems at odds with simple plume models, which have buoyant mantle distributed beneath the entire swell (as in Fig. 2). A nearly universal relation is that seismically fast rock is dense, yet the mantle is highly buoyant across the width of the swell (as discussed in the "Receiver Function" section). The only reasonable explanation for mantle that is both buoyant and relatively fast is that it is significantly depleted in basaltic components. Such depletion decreases density while increasing seismic velocity (Jordan, 1979), and this is one of the few cases where density and velocity correlate inversely. There is only one reasonable explanation for the

**Figure 4.** Schematic of mantle processes active within asthenosphere beneath Yellowstone swell. Buoyant and fertile mantle ascends beneath area of active hotspot magmatism, possibly supplied by mantle plume (see Fig. 5 for alternative model). Melt buoyancy drives convection in this mantle (large white arrows). Melt is expelled at top of convective roll (wavy red lines) and depleted residuum (blue areas) is pushed to sides, where it accumulates. When residuum buoyancy equals melt buoyancy, convective overturn ceases, leaving partially molten core (red areas). Buoyant mass then flattens (small white arrows) as it is carried southwest by North America plate motion. Effects of hotspot on North America are (1) magmatic modification of Snake River Plain (SRP) (basaltic underplating of crust, shown in yellow, and intrusion of basalt into midcrust, shown with blue tabular body), which loads and depresses SRP crust, and (2) uplift of region underlain by buoyant mantle (within the blue envelope), creating Yellowstone swell. With plate motion, Yellowstone encounters increasingly thick lithosphere of Wyoming craton. Figure 5 shows details of process. Diverging upper mantle flow evacuates asthenosphere from central area, forcing mantle ascent. Residuum and ascends (red-to-white arrows). Decompression melting causes Newberry magmatism follows these trends as fertile mantle flows past residuum and ascends (red-to-white arrows). Decompression melting causes convection (white arrows) and magmatism, creating new residuum at ends of stable lower mantle relative to southwest-moving North America (NA). Near the subduction zone upper mantle is forced to flow northwest (left red arrows) because of corner flow driven by subducting plate. Yellowstone and Newberry magmatism follows these trends as fertile mantle flows past residuum and ascends (red-to-white arrows). Decompression melting causes convection (white arrows) and magmatism, creating new residuum at ends of residuum body (Fig. 4 shows details of process). Diverging upper mantle flow evacuates asthenosphere from central area, forcing mantle ascent.

**Figure 5.** Forced mantle flow and decompression melting resulting from local plate motions. Far from subduction zone, a northeast-directed forced shear across upper mantle (right red arrow) results from northeast motion of stable lower mantle relative to southwest-moving North America (NA). Near the subduction zone upper mantle is forced to flow northwest (left red arrows) because of corner flow driven by subducting plate. Yellowstone and Newberry magmatism follows these trends as fertile mantle flows past residuum and ascends (red-to-white arrows). Decompression melting causes convection (white arrows) and magmatism, creating new residuum at ends of residuum body (Fig. 4 shows details of process). Diverging upper mantle flow evacuates asthenosphere from central area, forcing mantle ascent.

Dueker and Sheehan (1997) used P-to-S conversions from the 410 km and 660 km seismic discontinuities to assess if locally hot mantle (e.g., plume-affected mantle) deflects these interfaces. Making use of the fact that interface deflection is of opposite sign on these interfaces for a given temperature anomaly (Bina and Helffrich, 1994), the observed thinning of the intervening layer by ~20 km (Fig. 3) beneath the Snake River Plain suggests a thermal anomaly there of 150–200 °C. This result, however, is entirely a consequence of the upwarp in the 660 km discontinuity; the upwarped 410 km discontinuity implies cooler temperatures at this depth beneath the plain.

**S-wave Splitting and Upper Mantle Anisotropy**

Upper mantle strain via olivine dislocation creep tends to align the olivine a axis in the finite elongation direction, and even moderate strains (one or more) can create a significant fabric in this orientation (Ribe, 1992). Much like light traveling through a crystal, an S wave passing through anisotropic upper mantle will split into two orthogonally polarized waves, with the faster traveling wave vibrating parallel to the direction of the a axis. The polarization of SKS waves in a known direction makes them ideal for anisotropy studies. Figure 3 shows the results of split SKS waves recorded by our array (from Schutt et al., 1998). The fast-wave polarizations trend approximately N65°E, which is nearly aligned with the hot spot track and North America absolute plate motion. Waves that were naturally polarized with this orientation are not split, indicating that anisotropy of a different orientation does not exist at greater depth. The region of nearly uniform anisotropy orientation ends near the southeast margin of the swell, and most of the western United States has orientations not aligned with North America absolute plate motion (Savage and Sheehan, 2000). Thus the asthenosphere beneath the
Beneath Yellowstone continued from p. 5

Inferred compositional buoyancy of the blue mantle results from 5%–10% basal segregation, and this compositional buoyancy accounts for much of the swell’s high elevation (Saltzer and Humphreys, 1997).

ASSESSING YELLOWSTONE’S ORIGIN

Imaged seismic structures and calculated mantle buoyancy beneath the Yellowstone swell imply that the swell mantle is anomalously hot to depths of ≥200 km, is not anomalously hot at 410 km, and is hot again at 660 km. The red mantle beneath the Snake River Plain in Figure 3 is 1%–2% partially molten, and the blue mantle beneath the adjoining swell is 5%–10% depleted of basaltic components. Mantle is anisotropic beneath the swell, with finite extension oriented approximately N65E, and this orientation does not vary with depth. This anisotropy is unique to the Yellowstone swell; it contrasts with the western U.S. mantle away from the swell, which is more complexly strained in different orientations.

Plume or no plume, we can make sense of these results only if we include local convection beneath Yellowstone, as illustrated in Figure 4 (Saltzer and Humphreys, 1997). A source of hot and fertile mantle is needed to produce significant basaltic melt upon adiabatic ascent, and the melt buoyancy drives convection (as modeled by Tackley and Stevenson, 1993). Melt release occurs when melt migration rates exceed convective flow rates (probably at melt fraction of ~2%). The escaping melt underplates and intrudes the crust. Convection ceases when the buoyancy of accumulating residuum equals that of the partially molten core. This mantle overturn occurs beneath the active caldera system (currently at Yellowstone). Then, the entire buoyant mass flattens as it is transported by plate motion away from the site of magma release, creating the southwest-widening swell. Mantle strain occurs primarily through southwest-northeast-directed simple shear. This could result from plate motion over a more stable interior, or by flow of Yellowstone asthenosphere away from Yellowstone and confined to the low-viscosity volume of hotspot asthenosphere previously deposited. These conclusions are sound in that they explain the peculiar seismic and density structure observed beneath our array, and they account for the magma- tion. They do not specify a source for hot and fertile mantle. In particular, they permit the plume hypothesis for Yellowstone (but require convection to occur within the flattening hotspot asthenosphere).

However, once local upper mantle convection is recognized, there is potential to interpret Yellowstone entirely as an upper mantle phenomenon. Our model for this incorporates the flow interaction of asthenosphere with the volume of residuum created by prior melt release. Because this residuum is buoyant and relatively viscous, it tends to attach itself to the North America plate and move with this plate. The residuum protects the overlying plate by inhibiting subsequent magmatism, and as it is dragged along, asthenosphere flows beneath it and up as it passes the leading edge of the residuum body (as illustrated in Fig. 5). Melting occurs with ascent, driving the local convection that produces focused magmatism (as in Fig. 4) and adds to the residuum body.

Magmatic propagation therefore can be seen as a natural upper mantle process when hot, fertile mantle is subjected to shear, as in plate transport. Schmeling (2000) is propagating melt-driven convective instabilities in computer simulations. An especially attractive feature of this model is that the west, near the plate margin, upper mantle flow and shear directions probably are directed west-northwest, in the direction of Newberry propagation, as a result of subduction-driven corner flow (Fig. 5). Hence, both Yellowstone and Newberry magmatism can be explained by a single (upper mantle) mechanism. Furthermore, the divergence of upper mantle flow drives mantle ascent between Newberry and Yellowstone (Fig. 5) that can account for the initiation of magmatism over an elongate region. This could occur if unusually hot or fertile mantle were drawn up in a zone parallel to the subducting plate, or if the ascending mantle were focused on an area of fertile North America lithosphere, such as the Precambrian rift margin (where fertile asthenosphere “froze” onto North America during Paleozoic downwarping of this margin). And the observed 3He/4He anomaly can be attributed to drawing up some primordial lower mantle.

One can ask why other Yellowstones and Newberrys are not distributed around the western United States. In fact, there are other magmatic trends oriented northwest (most western Great Basin magmatism) and northeast (e.g., Jemez, St. George) with associated low-velocity mantle trends (Humphreys and Duerk, 1994). The relative vigor of Yellowstone magmatism may result from its tectonic setting (adjacent to the Cascadia subduction zone and where focused northeast-oriented extension occurs), or perhaps it may simply represent the activity of an unusual lithospheric trend (Iyer and Healey, 1972) or relatively hot mantle.

ACKNOWLEDGMENTS

This work was made possible by the PASSCAL instrument pool, and by National Science Foundation grants supporting work across the Yellowstone swell (EAR 9206565 and 9628474), the adjoining Wyoming and Colorado lithosphere (EAR 9418252 and 9614647) and greater Yellowstone area (EAR 9725598). Don Anderson, Norm Sleep, and Karl Karlstrom provided useful reviews.

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The 2000 GSA GeoVentures Program offered four programs unrelated to the annual or section meetings. The total of 84 participants, ranging in age from 34 to 80, represented a wide range of interests and backgrounds. This educational program serves professionals who enjoy their geology and the company of other geologists in a field setting. GeoVentures are a special benefit created for members, but are open to guests and friends also.

GeoVentures is the overall name for adult educational and adventure experiences of two kinds: GeoHostels and GeoTrips. Both are known for superior scientific leadership. Fees are moderate (relative to the destination, length, time of year, and number of participants). GeoHostels are usually five-day, campus-based programs. GeoTrips are anywhere from one to three weeks in length, and the itinerary covers a wide variety of destinations.

GeoTrip: Geology of the Grand Canyon—Lee’s Ferry to Pierce Ferry. April; 18 participants. Leader: Ivo Lucchitta, U.S. Geological Survey, Flagstaff, Arizona. “Ivo was incredible, very patient with answering my questions. The impact of the trip is still affecting me; I think I’m incredibly lucky to have gone on this trip and I hope I get to do it again!” wrote Shan Stuart, Aspen, Colorado. Photo by David Kirchner.

GeoTrip: Deformation, Dinosaurs, and Darwin. July–August; 15 participants. Leaders: James Reynolds, Brevard College, Brevard, North Carolina, and Dorothy L. Stout, Cypress College, Cypress, California. “Jim’s knowledge is superior! We enjoyed his humor and expertise. Dottie is a legend in her own time!” wrote Sandy Jewett and Peter Weigand, Granada Hills, California. Photo by Imelda Cragin.

GeoHostel: Geology of the Lewis and Clark Expedition: Lost Trail Pass to the Columbia River. July; 33 participants. Leaders: Robert Thomas and Sheila Roberts, Western Montana College, Dillon, Montana. “Great leaders—very knowledgeable. Their styles complemented one another. I liked the way Rob elicited comments and speculation from the group,” wrote Bea Mayes, Salt Lake City, Utah. Photo by Rob Thomas.

GeoHostel: Geology of Southern Utah—Valley of Fire in Southern Nevada, Zion and Bryce Canyon National Parks of Southern Utah. June; 18 participants. Leaders: Spence Reber, Chevron USA (retired), and Janice Higgins, Dixie College, St. George, Utah. “Leaders were excellent! Spence wrote the book!” said Mel Weidner, Mesa, Arizona. Photo by Frank Kresse.

GeoHostel in southern Utah on his eighth GeoVenture. Photo by Edna Collis.

Frank Kresse in southern Utah on his eighth GeoVenture. Photo by Edna Collis.
A Geo-Odyssey

Now that you’re home from Reno, it’s time to start thinking about booking your trip to Boston for A Geo-Odyssey, GSA’s Annual Meeting and Exposition in November 2001.

You are invited to submit proposals for topical sessions and Pardee Keynote Symposia for this important earth science summit. Proposals are due by January 8, 2001, and must be submitted electronically at www.geosociety.org.

Boston is not only a magnificent city with world-class meeting facilities, myriad fine dining and entertainment choices, and fascinating historical sites and tours, it’s a showcase for varied geology. Highlights include the crystalline rocks of the northern Appalachians, Pleistocene and coastal sediments and geomorphology, hydrological and environmental reclamation sites such as nearby Woburn of “A Civil Action” fame, and downtown Boston’s current ambitious highway engineering wonder, the Big Dig. (See the November issue of GSA Today for more on Boston.)

Program Opportunities

Whether this will be your first trip to a GSA Annual Meeting or your twenty-first, you’ll find that the program’s mixture of invited and volunteered papers and varying session formats allow for an effective, dynamic, and flexible lineup.

Joint Technical Program Committee (JTPC) representatives play a large role in program decisions. Descriptions of the various program options and guidelines are available at www.geosociety.org. Since modifications are made from year to year, please read the guidelines carefully before submitting a proposal. Two types of sessions can be proposed:

Topics for Pardee Keynote Symposia, made possible by a grant from the Joseph T. Pardee Memorial Fund, should be of broad interest to the geoscience community, be on the leading edge in a scientific discipline or area of public policy, address broad fundamental problems, be interdisciplinary, or focus on global problems. Selection is on a competitive basis; the primary criterion is excellence. Four to six half-day, nonconcurrent sessions will be offered. All speakers will be invited.

Topical Sessions promote the exchange of timely or state-of-the-art information on a central topic and allow scheduling of interdisciplinary talks on a specific topic. Organizers (advocates) may invite specific papers to ensure a successful and excellent session, but must include volunteered abstracts, which are solicited in GSA Today for all approved topical sessions. A maximum of four invited speakers may be allowed, although advocates may request more invitations. Advocates may request considerations such as a special format. All requests are reviewed by the JTPC for approval. To be part of the technical program, all sessions must receive a minimum of 12 abstracts. Advocates are encouraged to submit proposals as poster sessions to accommodate the growth of the technical program and the limitations of meeting space.

Oral and Poster General Sessions

The number of abstracts received determines the number of general sessions (consisting entirely of volunteered papers) in each discipline. The goal of the Technical Program Committee (TPC) and the JTPC representatives is to provide presenters the best possible opportunity for communicating new scientific information rather than to dictate what can or will be presented. (The rejection rate for recent GSA Annual Meetings has been less than 5%. ) Expanded poster sessions allow presentation of more papers. An effort will be made to avoid scheduling poster sessions concurrently with oral sessions in the same discipline to allow for well-attended, dynamic sessions.

Hot Topics Spice up the Lunch Hour

These hour-long lunchtime forums differ from technical sessions in that they focus on discussion and audience participation. A debate format is recommended; panels are discouraged. Each session must have a moderator, and titles should be catchy and provocative. If you are interested in organizing a session or in being a Hot Topics Chair, contact Technical Program Co-Chair Rob Young.

If you have any questions or concerns regarding the program, please call or e-mail one of the following people.

Rob Van der Voo, Annual Program Chair (2000–2001), (734) 764-8322; voo@umich.edu.

Rob Young, Technical Program Co-Chair, (828) 227-3822; ryoung@wcuva1.wcu.edu.

David Bush, Technical Program Co-Chair, (770) 836-4597; dbush@westga.edu.

2001 Schedule

January 8 Proposals due. Firm deadline; electronic submissions required.

April Electronic abstracts form available at www.geosociety.org for active submissions.

July 17 Paper-copy original and 5 copies due at GSA. Firm deadline. No paper abstracts accepted after this date—no exceptions.

July 24 Electronic abstracts deadline. Electronic copies accepted until midnight (MST).

August 17 Program schedule finalized.

September 4 Accepted abstracts appear on www.geosociety.org.

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Chronicles of a Volcanologist
Richard V. Fisher

“R. V. Fisher is, without a doubt, one of the premier volcanologists of the latter half of the twentieth century. Fisher writes in a light and lucid prose . . . The result is an engaging, human and modest account.”
—David Pyle, Geological Magazine
Final Announcement

NORTHEASTERN SECTION, GSA
36th Annual Meeting

Burlington, Vermont, March 12-14, 2001
www.geosociety.org/sectdiv/northe/01nemtg.htm

The hosts for the 2001 meeting of the GSA Northeastern Section are geologists from the University of Vermont, Middlebury College, Norwich University, Vermont State Colleges at Johnson, Lyndonville, and Castleton, the State University of New York at Plattsburg, the Vermont Geological Society, and the Vermont Geological Survey. Meeting in conjunction are the Eastern Section of the Society for Sedimentary Geology (SEPM), the Northeastern Section of the Paleontological Society (NEPS), the Eastern New England Sections of the National Association of Geology Teachers (NAGT), the Association for Women Geoscientists, and the council on Undergraduate Research Geology Division. The meeting will be held at the Sheraton Conference Center, 870 Williston Road, Burlington, VT 05403.

REGISTRATION

Preregistration deadline: February 2, 2001

Registration will be handled by GSA Headquarters. To obtain lower registration fees and to assist planning by the local committee, please preregister online at www.geosociety.org, or use the preregistration form found on page 14.

Preregistration discounts are given to members of GSA and the associated societies listed on the preregistration form. Students and K-12 teachers must send or show a current ID in order to obtain these rates. Preregistration forms must be received by GSA no later than February 2, 2001. Register only one professional or student per form and retain a copy for your records. If you preregister, your badge will be mailed to you approximately two weeks prior to the meeting. For detailed information, visit the Web site given above.

CANCELLATIONS, CHANGES, AND REFUNDS

All requests for additions, changes, and cancellations must be made in writing and received by February 9, 2001. There will be NO refunds for on-site registration, Abstracts with Programs and ticket sales. Members pay less. You can join now or at the meeting. Contact GSA Headquarters at (303) 447-2020 for further information.

LOCATION AND DIRECTIONS

Meeting registration, technical sessions, poster sessions, and exhibits will be in the Sheraton Conference Center, 870 Williston Road (Route 2), Burlington, VT. See accompanying map or the GSA Web site. The Burlington area is located on the eastern shore of Lake Champlain, which is bordered to the east by the Green Mountains and to the west by the Adirondack Mountains. The metropolitan area of approximately 120,000 is conveniently located near many of the major ski areas. Temperatures during March range from the 30s to the 50s. The area is conveniently served by several major airlines, while rail and an excellent highway system connect with central and southern New England, New York, and eastern Canada.

TECHNICAL PROGRAM

Oral sessions will normally include 15 minutes for presentation and five minutes for questions and discussion. Two 35 mm projectors, two screens, and one overhead projector will be provided in each of the oral sessions. Speakers are encouraged to bring their slides already loaded into carousel trays.

Speaker Ready Room

The Kingsland room at the Sheraton Conference Center will be available Sunday, March 11, 6-10 p.m., Monday and Tuesday, March 12 and 13, 7 a.m.-9 p.m., and Wednesday, March 14, 7 a.m.-noon for previewing slides. Additional carousel trays may be signed out from the speaker ready room. For those wishing additional technical services, please contact Paul Bierman, Department of Geology, University of Vermont, Burlington, VT 05405, (802) 656-3396, fax 802-656-0045, pbierman@zoo.uvm.edu.

Poster Sessions

Poster sessions will allow three hours of display time; the authors must be present for two hours. Two 4 x 4 foot and one 4 x 8 foot boards will be provided for each U-shaped booth. Access to electrical outlets and furniture for poster sessions must be requested well in advance. Contact Barry Doolan, Department of Geology, University of Vermont, Burlington, VT 05405, (802) 656-0248, fax 802-656-0045, bdoolan@zoo.uvm.edu.

Northeastern Section continued on p. 12
ABSTRACTS

Abstracts Deadline: December 5, 2000

Abstracts for all sessions must be submitted on-line, at the GSA Web site. If you are unable to submit your abstract electronically, please contact the GSA Technical Program Coordinator, Nancy Carlson, (303) 447-2020, ext. 161, ncarlson@geosociety.org. Only one volunteered paper may be presented on an individual; however a person may be a coauthor on other papers. Also, those invited for symposia may present additional papers.

SYMPOSIA

Symposia will include invited papers and selected volunteered papers. Prospective authors are encouraged to contact individual conveners directly. Address requests for general information regarding symposia to Tracy Rushmer, or Andrea Lini, Department of Geology, University of Vermont, Burlington, VT 05405, (802) 656-3396, fax 802-656-0045, trushmer@zoo.uvm.edu; Gayle Gleason, (802) 656-3398, gogleas@colby.edu; Michael Brown, mbrown@umd.edu.

1. Caledonian Magmatism: Cross-Atlantic Connections. John Hogan, (573) 341-4618, jhogan@umr.edu; Calvin G. Barnes (806) 742-3106, Cal.Barnes@ttu.edu; Øystein Nordgulen, oysten.nordgulen@nju.no; A.K. Sinha, pitlab@vt.edu.

2. Fault Zone Evolution and Convergent Tectonics—A Symposium in Honor of Rolfe Stanley. Keith Klepeis, (802) 656-0246, kkklepeis@zoo.uvm.edu; Marjorie Gale, (802) 241-3608, MARJIEG@dec.anr.state.vt.us.

3. Glacial Processes in New England: Sequence Stratigraphy—Tectonic and Eustatic Signatures in Eastern Laurentia. Sponsored by the Northeast Section of SEPM. Ed Landing, (518) 474-5816, elanding@mail.nysed.gov; Carlton E. Brett, (513) 556-4556, brettce@email.uc.edu.

4. Deformation, Metamorphism, and Melting: Interactions in the Crust. Tracy Rushmer, (802) 656-8136, trushmer@zoo.uvm.edu; Gayle Gleason, (207) 872-3248, gogleas@colby.edu; Michael Brown, mbrown@umd.edu.

5. Geologic Evolution of the Northern Appalachians: The Quebec–Vermont Connection. Barry Doolan, (802) 656-0248, bdoolan@zoo.uvm.edu; Jonathan Kim, (802) 241-3469, jonk@dec.anr.state.vt.us; Sébastien Castonguay, (418) 654-2566, scastong@nrcan.gc.ca; Alain Tremblay, (418) 654-2568, atremblay@nrs.quebec.ca.

6. Carbonate Geology with a Focus on the Trenton-Black River and Beekmantown. Sponsored by the Northeast Section of SEPM. Gerald Friedman, (518) 273-3247.

7. Geologic Aspects of Environmental Problems in the Northeast. Jamie Stanley, (802) 282-4466, jstanley@usgs.gov; Scott W. Bailey, (603) 726-8902, swbailey@fs.fed.us.


9. K-16 Education: Earth and Environmental Science. Christine Massey, (802) 656-1344, cmassey@zoo.uvm.edu; Leslie Kanat, (802) 635-1327, kanat@badger.jsc.usc.edu.


SHORT COURSES

The STELLA and GIBBs short courses will be held in Perkins Hall, Computer Laboratory, University of Vermont. Contact instructors for further information.

1. System Dynamic Modeling of Natural Environments: An Introduction to STELLA. Sunday, March 11, 9 a.m.—5 p.m. Al Cassell, ecassell@zoo.uvm.edu, School of Natural Resources; Jim Hoffmann, Dept. of Botany; and Jack Drake, Dept. of Geology, University of Vermont. Cost: $40 Professional, $20 Student. Max.: 18, Min.: 5.


WORKSHOP

Roy Shlemon Mentor Program in Applied Geology. Monday, March 12, 11:30 a.m.—1:30 p.m. Valcour Room, Sheraton Conference Center. Practical advice for graduate and undergraduate students with career interests in consulting. This is a workshop on professional opportunities and challenges in the applied geosciences. Cost: $5, lunch provided. Max.: 20. Preregistration is required; however, meeting registration is not required to attend this workshop.

FIELD TRIPS

The field trip coordinator is Stephen Wright, Department of Geology, University of Vermont, Burlington, VT 05405; (802) 656-4479, swright@zoo.uvm.edu. The trips will run depending on weather. Contact leaders listed below for further information.

Sunday, March 11

1. The Stanley Outcrops. 9 a.m.—5 p.m. Barry Doolan, bdoolan@zoo.uvm.edu, and Keith Klepeis, kkklepeis@zoo.uvm.edu. Meet at the Sheraton Conference Center parking
2. **Teaching Hydrology in the Winter, a Hands-On Field Trip.**
   - 7:30 a.m. - 5 p.m. Paul Bierman, pbierman@zoo.uvm.edu, and Kyle Nichols, knichols@zoo.uvm.edu. Meet at the Perkins Building, University of Vermont. Lunch Provided. Cost: $30 Professional, $20 Student.

### Monday, March 12, and Tuesday, March 13

3. **The Champlain Thrust at Lone Rock Point.** University of Vermont staff; 2-3 hour trip, morning or afternoon. Further details will be available at the registration desk.

### Monday, March 12, and Wednesday, March 14

4. **The Salmon Hole-Redstone Quarry.** University of Vermont staff; 2-3 hour trip, morning or afternoon. Further details will be available at the registration desk.

### Exhibits

Exhibits will be located in the Champlain Room of the Sheraton Convention Center; snacks and refreshments will be continuously available for exhibit visitors. Deadline for reserving space is March 1, 2001. The cost of standard booths will be $300 for commercial exhibitors and $200 for educational or nonprofit groups or institutions. For further information and space reservations, contact the Exhibits Coordinator, Barry Doolan, Dept. of Geology, Perkins Geology Hall, University of Vermont, Burlington, Vermont 05405, (802) 656-0248, bdoolan@zoo.uvm.edu.

### SPECIAL EVENTS

#### GSA Northeastern Section Management Board Meeting.
- Sunday, March 11, 5–7 p.m. Sheraton Conference Center, Diamond II Room.

#### Welcoming Reception.
- Sunday, March 11, 6–9 p.m. Sheraton Conference Center, Emerald Ballroom.

#### Paleontological Society Northeastern Section, Luncheon.
- Monday, March 12, noon–1:30 p.m. Sheraton Conference Center, Shelburne Room. Professionals $27, Students $15. Preregistration required. Limit 30.

#### Eastern Section of SEPM Business Meeting and Reception.
- Monday, March 12, 5–7 p.m. Sheraton Conference Center, Valcour Room.

#### University of Vermont Perkins Geology Museum Open House.
- Monday, March 12, 5–7 p.m. Perkins Geology building, University of Vermont. Contact Christine Massey, Dept. Geology, University of Vermont, Burlington, Vermont 05405, (802) 656-1344; cmassey@zoo.uvm.edu.

#### Map Blast IV.
- Monday, March 12, 7:30–9:30 p.m. An informal session for display and discussion of newly published, unpublished, or in-progress geologic maps of any sort. Contact Stephen Wright, Department of Geology, University of Vermont, Burlington, VT 05405, (802) 656-4479, swright@zoo.uvm.edu.

#### Association for Women Geoscientists Breakfast Buffet.
- Tuesday, March 13, 6–8:30 a.m. Sheraton Conference Center, Valcour Room. Professionals $15, Students $10. Preregistration required. Limit 40.

#### Northeastern Section of NAGT Luncheon and Business Meeting.
- Tuesday, March 13, noon–1:30 p.m. Sheraton Conference Center, Shelburne Room. Professionals $27, Students $15. Preregistration required. Limit 30.

#### GSA Northeastern Section Reception and Banquet.

### Accommodations

Meeting participants will get special rates at the Sheraton in Burlington, 1-800-677-6576, fax 802-865-6670. Single $95 plus tax; double $100; triple $105 plus tax; quad $110 plus tax. Reservation deadline is February 1, 2001. When making reserva-

### Guest Activities and Events

Additional guest activities and events will be listed on the Web site as they become available.

#### Fun Run.
- Monday, March 12, and Tuesday, March 13, mornings. Information available at the registration desk.

#### Ski Day—Smugglers Notch.
- Sunday, March 11. For reservations and information, see the Web site.

### Child Care

Child care is available through Home-sitting Service, (802) 879-1336.

### Detailed Information

For further information, see www.geosociety.org or contact General Chair Tracy Rushmer, Dept. of Geology, University of Vermont, Burlington, VT 05405, (802) 656-8136, trushmer@zoo.uvm.edu, or Technical Program Chair Andrea Lini, Dept. of Geology, University of Vermont, Burlington, VT 05405, (802) 656-0245, alini@zoo.uvm.edu.

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### Contact Information:

- For general information and registration, contact Andrea Lini, Dept. of Geology, University of Vermont, Burlington, VT 05405, (802) 656-8136, trushmer@zoo.uvm.edu, or Technical Program Chair Andrea Lini, Dept. of Geology, University of Vermont, Burlington, VT 05405, (802) 656-0245, alini@zoo.uvm.edu.
## PREREGISTRATION FORM

**GSA Northeastern Section • Burlington, Vermont • MARCH 12-14, 2001**

Preregistration deadline: February 2, 2001    Cancellation deadline: February 9, 2001

You can also register online at www.geosociety.org.

### TICKETED EVENTS

<table>
<thead>
<tr>
<th>Event Description</th>
<th>Professional</th>
<th>Student</th>
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<tr>
<td>Paleontological Society Luncheon—Monday, March 12</td>
<td>(301) $27</td>
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<td>AWG Breakfast Buffet—Tuesday, March 13</td>
<td>(302) $15</td>
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<td>NAGT Luncheon—Tuesday, March 13</td>
<td>(303) $27</td>
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<td>GSA Northeastern Section Reception and Banquet—Tuesday, March 13</td>
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<td>Prime Rib</td>
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<td>Chicken Marsala</td>
<td>(305) $25</td>
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<td>Ravioli Pesto</td>
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<td>FIELD TRIPS</td>
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<td>The Stanley Outcrops—Sunday, March 11 (9 a.m.–5 p.m.)</td>
<td>(401) $30</td>
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<td>Teaching Hydrology in the Winter: A Hands-On Field Trip—Sunday, March 11 (7:30 a.m.–5 p.m.)</td>
<td>(402) $30</td>
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<td>SHORT COURSES</td>
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<td>System Dynamic Modeling of Natural Environments: An Introduction to STELLA—Sunday, March 11 (9 a.m.–5 p.m.)</td>
<td>(501) $40</td>
<td>$</td>
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<tr>
<td>New Advances in XRF Spectroscopy—Sunday, March 11 (9 a.m.–noon)</td>
<td>(502) Free</td>
<td>FREE</td>
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<tr>
<td>Full-Pattern Rietveld Analysis—Sunday, March 11 (1:30–4 p.m.)</td>
<td>(503) Free</td>
<td>FREE</td>
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<tr>
<td>Thermodynamic Modeling of Mineral Reactions: An Introduction to GIBBS—Monday, March 12 (6–9 p.m.)</td>
<td>(504) $20</td>
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### WORKSHOP

1. Roy Shlemon Mentor Program in Applied Geology
   - Professional: (601) $20
   - Student: (601) $15

### PREREGISTRATION FEES (US$)

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<th>Column A</th>
<th>Professional Member*</th>
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<th>Professional Nonmember</th>
<th>Student Member or Associate Member*</th>
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<td>(32) $37</td>
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*Member fee applies to any current Professional OR Student Member of GSA or Associated Societies listed above. Discount does not apply to guest registrants.

**Workshop registration fee does not allow access to technical sessions.**

### FAX TO:

303-443-1510 or 303-447-0648

MAIL TO:

GSA NORTHEASTERN MEETING,  P.O. BOX 9140  
BOULDER, CO 80301-9140

Remit in U.S. funds payable to 2001 GSA Northeastern Section 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
SOUTHEASTERN SECTION, GSA 50th Annual Meeting

Raleigh, North Carolina, April 5–6, 2001

www.meas.ncsu.edu/segsa/ or www.geosociety.org/sectdiv/southe/01semtg.htm

The 50th Annual Meeting of the Southeastern Section of GSA (SEGSA), hosted by the Department of Marine, Earth and Atmospheric Sciences at North Carolina State University, in conjunction with the North Carolina Geological Survey and the North Carolina Museum of Natural Sciences, will be held Thursday and Friday April 5–6, 2001, in Raleigh, North Carolina.

LOCATION AND TRANSPORTATION

Raleigh, North Carolina’s state capital, is located where U.S. Highway 1, U.S. Highway 64, and Interstate 40 come together. Shuttle service from Raleigh-Durham International Airport (RDU) to downtown Raleigh (about 20 minutes away) is available from R & G Airport Shuttle for $20 one way. Raleigh (about 20 minutes away) is available from R & G Airport Shuttle for $20 one way.Maps of various scales are available at www.raleighcvb.org/maps.html.

REGISTRATION

Preregistration deadline: February 23, 2001

Cancellation deadline: March 2, 2001

Please preregister to qualify for lower fees and to assist the local committee in preparing. Online preregistration at www.geosociety.org/sectdiv/southe/01semtg.htm is strongly encouraged. You may also use the form that accompanies this announcement. Full payment MUST accompany your preregistration.

Registration is required for all who attend technical sessions, guest activities, or the exhibit hall. Guest registrants (nongeologists, spouses or friends) must be accompanied by either a registered professional or student. Students and K-12 educators must show a current ID for reduced rates. Attendees should make their own reservations with the Sheraton by calling (919) 834-9900 or 1-800-325-3535, or by visiting their Web site at www.sheratoncapital.com. Additional rooms are available a few blocks away at the Holiday Inn—State Capital, 320 Hillsborough St., Raleigh, NC 27603, for the same rate of $85 per night (double or king); call (919) 832-0501, 1-800-HOLIDAY, or visit www.holiday-inn.com to reserve a room. When making your reservations, be sure to mention that you are with the SEGSA in order to qualify for the reduced rates.

FIELD TRIPS

Preregistration deadline: February 23, 2001

Cancellation deadline: March 2, 2001

Address general questions to Charles W. Hoffman, Field Trip Chair, (919) 733-7353, ext. 25, bill.hoffman@ncmail.net. Address specific questions to the field trip leaders listed below. See the meeting Web site (www.meas.ncsu.edu/segsa or at www.geosociety.org) for full field trip descriptions and updated information. Unless otherwise noted, trips depart from and return to the Sheraton Capital Center Hotel.

Field trip participants must register for the meeting. A $5 field-trip-only registration option is available.

Premeeting

1. Framing the Piedmont Zone in North Carolina and Southern Virginia. Jim Hibbard, North Carolina State University, jhibbard@ncsu.edu, (919) 515-7242; Kevin Stewart, University of North Carolina, Chapel Hill, kgstewar@email.unc.edu; and Bill Henika, Virginia Department of Mines, Minerals and Energy, and Virginia Tech, henika@vtvm1.cc.vt.edu. April 2–4; min. 15, max. 20; trip starts in Spruce Pine, NC, and ends at the meeting site;

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Southeastern Section continued from p. 15

cost of $210 includes guidebook, transportation, three nights lodging (April 1–3), and lunches during trip. Registrants needing transportation from Raleigh to Spruce Pine should contact leader.

2. Depositional and Structural Framework of the Deep River Triassic Basin, North Carolina. Tyler Clark, North Carolina Geological Survey, tyler.clark@ncmail.net, (919) 733-2423; Pamela Gore, Georgia Perimeter College, pgore@gpc.peachnet.edu; and Mary Watson, North Carolina Geological Survey, mary.watson@ncmail.net. This regional overview will set the stage for the detailed Triassic field trip scheduled the following day (Trip 3). April 3; min. 10, max. 25; cost of $38 includes guidebook, transportation, lunch and snacks. Trip is cosponsored by SE–SEPM, SE–NAGT, and SE–GSA Education committee. Registrants who also register for Trip 3 will receive a rebate of $10 (the cost of a 2nd guidebook).

3. Structural Features Exposed in Triassic Sedimentary Rocks near the Proposed Low-Level Radioactive Waste Disposal Site, Southwestern Wake County. Rick Wooten, North Carolina Geological Survey, rick.wooten@ncmail.net, (919) 733-2424; Jerry Bartholomew, University of South Carolina, jbarth@esi.esi.sc.edu; and Peter Malin, Duke University, pem@geo.duke.edu. We will visit exposures in borrow pits and discuss how recent detailed mapping relates to recently completed 7.5-minute quadrangle mapping and regional geology seen during Trip 2. April 4; min. 10, max. 25; cost of $35 includes guidebook, transportation, lunch and snacks. Registrants who also register for Trip 2 will receive a rebate of $10 (the cost of a 2nd guidebook).

4. North-South Transect of the Goochland Terrane and Associated A-type Granites, Virginia–North Carolina. Stewart Farrar, Eastern Kentucky University, gylfarrar@acs.eku.edu, (859) 622-1279; and Brent Owens, University of Kentucky, glyfarra@acs.eku.edu, (859) 622-1279; Mary Watson, N.C. Geological Survey, mary.watson@ncmail.net. Registrants needing transportation from Raleigh to Richmond should contact leader.

5. Cape Fear River Transect: The Cretaceous Cape Fear, Black Creek, and PeeDee Formations of Southeastern North Carolina and the Overlying Tertiary Section. Kathleen M. Farrell, North Carolina Geological Survey, kathleen.farrell@ncmail.net, (919) 733-2423; Lauck B. Ward, Virginia Museum of Natural History, lward@vmnh.org; and S. Duncan Heron Jr., Duke University, heron@eos.duke.edu. April 3–4; min. 10, max. 20; trip starts and ends in Fayetteville, NC; cost of $185 includes guidebook, transportation, one night lodging (April 3), and lunches during trip. Trip is cosponsored by Southeast Section SEPM and Paleontological Society. Registrants needing transportation to/from Raleigh should contact leader.

6. Coastal Processes, Habitats, and Evolution of the Cape Lookout Cupulate Foreland. Steve Snyder, North Carolina State University, johndavid.snyder@ncsu.edu; and John W. Wells, University of North Carolina, Chapel Hill, jwells@unc.edu. April 1–4; min. 15, max. 25; trip starts in Morehead City, NC, and ends at the meeting site; cost of $240 includes guidebook, boats, ground transportation, four nights lodging (March 31 – April 1–3), and lunches during trip. Registrants needing transportation from Raleigh to Morehead City should contact leader. Registrants who opt for dormitory lodging will receive a rebate of $60.

During the Meeting

7. Building Stone Use in Historical and Modern Architecture of Downtown Raleigh, North Carolina—A Walking Tour. Al Carpenter, N.C. Geological Survey (retired), alvalcarp@mindspring.com, (919) 553-4572. Half-day walking tour in downtown Raleigh area. Afternoon of April 6, or morning of April 7; min. 10, max. 30; cost of $10 includes guidebook. See also Trip 11.

8. Inquiry-Based Field Trip to Outstanding Geological Sites in the Triangle—For all Educators (Especially Secondary). Lynne Gronback, l Gronback@mindspring.com, (919) 644-2681, Rob Greenberg, antares8@mindspring.com, and Ruben Giral, dcbuen@mindspring.com, all at McDougle Middle School, Chapel Hill; and Mary Watson, N.C. Geological Survey, mary.watson@ncmail.net. April 6; min. 15, max. 30; cost of $20 includes guidebook, transportation, lunch and snacks. Trip is cosponsored by SE–NAGT, NCSTA, and SEGSA Education Committee.

Postmeeting

9. A Temporal View of Terranes and Structures in the Eastern North Carolina Piedmont. Dave Blake, University of North Carolina at Wilmington, dBlake@uncw.edu, (910) 962-3387; Tyler Clark, N.C. Geological Survey, tyler.clark@ncmail.net; and Matt Heller, North Carolina Ground Water Section, matt.heller@ncmail.net. April 7; min. 15, max. 25; cost of $40 includes guidebook, transportation, lunch and snacks.

10. The Tate-Marble Hill Window in the Marble Belt of Northern Georgia. Mike Higgins, mhiggins@mindspring.com, (770) 641-1268, and Ralph Crawford, Applied Mapping Systems, Inc., Tim La Tour and John Costello, Georgia State University; Bill Grant, Applied Mapping Systems, Inc.; Mike Linkous, M. Huber, Corp.; and Tonya Edwards, Georgia State University. April 7–8; min. 15, max. 24; trip starts and ends in Atlanta, GA; cost of $140 includes guidebook, transportation, one night lodging (April 7), and lunch on both days. Note: Those interested in attending this trip but not the meeting in Raleigh may use the $5 field-trip-only registration category.


ABSTRACTS

Abstract deadline: January 2, 2001

Abstracts for all sessions should be submitted online through the GSA Web site. If you are unable to submit your abstract electronically, contact GSA Technical Program Coordinator Nancy Carlson, (303) 447-2020, ext. 161, ncarlson@geosociety.org. Late abstracts or abstracts sent by e-mail or fax will not be accepted. Only one volunteered paper may be presented by an individual; however, a person may be a coauthor on other papers. Those invited for symposia may present additional papers.

TECHNICAL PROGRAMS

For additional information, contact Technical Program Chair Ron Fodor, rfdor@ncsu.edu, (919) 515-7177, or the conveners of specific sessions.

SYMPOSIAS

1. 50th Anniversary Symposium: History of Geology in the Southeastern Section. (Sponsored by the SEGSA Education Committee and History of Geology in the Southeastern Section, University of Virginia, Mississippi State University, University of Kentucky, Tennessee, Knoxville, and Oak Ridge National Lab; and Bill Thomas, University of Kentucky.


Southeastern Section continued on p. 17
Southeastern Section continued from p. 16

3. Cenozoic Evolution of the Appalachian Orogen. Jim Knapp, University of South Carolina, knapp@geol.sc.edu, (803) 777-6886; Ray Christopher, Clemson University; and Dave Prowell, U.S. Geological Survey.

4. Advances in Geochronology and Thermochronology in the Appalachian Orogen. Brent Miller, University of North Carolina, Chapel Hill, bmvillmer@email.unc.edu, (919) 962-6583; and Scott Samson, Syracuse University.

5. Great Ideas in Teaching Geoscience—K–16. (Cosponsored by SE Section NAGT and the SEGSA Education Committee.) Michael Gibson, University of Tennessee, Martin, mgbison@utm.edu, (901) 587-7435; and David Kopaska-Merkel, Geological Survey of Alabama.


7. Atlantic Coastal Plain Geology: A Symposium in Honor of Gerald H. Johnson. Heather Macdonald, College of William and Mary, rhmacd@mail.wm.edu; and Scott Harris, Coastal Carolina University.

8. Beach Nourishment: The Wave of the Future for Erosion Control. Bill Cleary, University of North Carolina, Wilmington, clearyw@uncw.edu, (910) 256-3721, ext. 251; and Orrin Pilkey, Duke University.

9. Terrane Boundaries and Paleosubduction Zones in the Inner Piedmont and Blue Ridge: Where are They and What is Their History? Calvin Miller, Vanderbilt University, millerf@ctrvax.vanderbilt.edu, (615) 322-2232; and Bob Hatcher, University of Tennessee, Knoxville, and Oak Ridge National Lab.

THEME SESSIONS


2. The Stratigraphy of the Southeastern Atlantic Coastal Plain: A Poster Session with Core Samples. Kathleen Farrell, N.C. Geological Survey, Kathleen.Farrell@ncmail.net, (919) 733-2423; and Bill Harris, University of North Carolina, Wilmington. POSTERS ONLY

3. Triassic Basins of the Southeastern United States. (Sponsored by the SE Section SEPM.) Paul Thayer, University of North Carolina, Wilmington, Thayer@uncwil.edu, (910) 962-3780; and Dan Texeira, University of North Carolina, Chapel Hill.

4. Engineering and Environmental Geology. (Sponsored by Engineering Geology Division.) Charles Welby, North Carolina State University, cwelby@unity.ncsu.edu, (919) 515-7158.

5. Great Ideas in Teaching Geoscience—K–16. (Cosponsored by SE Section NAGT and the SEGSA Education Committee.) Lynne Gronback, McDougle Middle School, Chapel Hill, Lgronback@mindspring.com, (919) 644-2681.

6. Geologic Linkages between Land and Sea: Estuarine Sediment Dynamics and Deposits. Clark Alexander, Skidaway Institute of Oceanography, clark@skio.peachnet.edu, (912) 599-2329; and John Wells, University of North Carolina, Chapel Hill.


8. Granitoid Plutons, Rocks, and Minerals. Loren Raymond, Appalachian State University, raymondla@appstate.edu, (828) 262-2749; and Sam Swanston, University of Georgia.

9. Undergraduate Research. (Sponsored by the Council for Undergraduate Research.) Brannon Andersen, Furman University, brannon.andersen@furman.edu, (864) 294-3366. POSTERS ONLY

10. Terrane Boundaries and Paleosubduction Zones in the Inner Piedmont and Blue Ridge: Where are They and What is Their History? Calvin Miller, Vanderbilt University, millerf@ctrvax.vanderbilt.edu, (615) 322-2232; and Bob Hatcher, University of Tennessee, Knoxville, and Oak Ridge National Lab.

11. Paleocology of the Paleogene Coastal Plain: An Interdisciplinary Testing Ground. (Sponsored by the Paleontological Society.) Steve Hageman, Appalachian State University, HagemanS@appstate.edu, (828) 262-6609.

12. Terrestrial Vertebrate and Ecosystem Evolution of the Southeast. (Sponsored by the Paleontological Society.) Reese Barrick, North Carolina State University, reese_barrick@ncsu.edu, (919) 515-7648.

DISCIPLINE SESSIONS

Volunteered abstracts that are not included in listed Theme Sessions will be organized into Discipline Sessions.

PROJECTION EQUIPMENT

Meeting rooms for the oral presentations will be equipped with two 35 mm slide projectors and an overhead projector. Computer-type projection systems will not be available, nor are they permitted under our AV contract. Speakers should bring their own carousel trays, already loaded with their slides. Slide trays should be labeled with speaker’s name, session, and speaker number, and should be delivered to the projectionist immediately prior to the beginning of the session.

SPEAKER READY ROOM

The room will be open to preview slides and transparencies Wednesday, April 4, 4:30–7:30 p.m., Thursday, April 5, 7 a.m.–7 p.m., and Friday, April 6, 7 a.m.–2:30 p.m. A limited number of carousel trays will be available to check out from the Speaker Ready Room.

POSTER SESSIONS

Poster presentations allow extended discussion, and permit more effective presentation of some types of visual material such as maps. Theme Sessions 1, 2, and 9 are poster-only format; in other cases, please indicate your preference for a poster session when you submit your abstract. Each poster will be displayed on one 4 x 8 foot board; bring your own push pins for mounting your display.

KEYNOTE ADDRESS

Thursday, April 5, 5:15 p.m., Hannover Ballroom

STUDENT PROGRAMS

Undergraduate Student Research.
A special poster session is sponsored by the Council for Undergraduate Research. Contact Brannon Andersen, Furman University, at (864) 294-3366 or brannon.andersen@furman.edu.

Roy Shlemon Mentors in Applied Geology Student Workshop. This GSA-sponsored program acquaints advanced undergraduate and graduate students with careers in applied geoscience. The mentor provides real-world information and insight students may not be exposed to in academic experiences. Watch for updates in GSA Today as details become available. The $3 cost includes lunch. Friday, April 6, 12 noon–1:30 p.m. Meeting registration is not
Southeastern Section continued from p. 17

required to attend this workshop. 

Exhibits. Exhibitors will include companies, agencies, and academic departments, providing students with the opportunity to discuss potential jobs or graduate school opportunities. 

STUDENT TRAVEL GRANTS 

The Southeastern Section awards travel grants to students who are presenting papers at the meeting. All eligible students will receive some support, with the amount depending on the number of applicants. For the application form visit www.geology.ecu.edu/geology/segsa/travel.html. Applications must be postmarked no later than March 1, 2001. Contact Donald Neal, (252) 328-4392, neald@mail.ecu.edu for more information.

K-12 PROGRAMS 

Several of the technical programs should be of interest to those in pre-college education. Speakers in Symposium 6 will discuss aspects of the recent changes made in the science curriculum of the North Carolina Department of Public Instruction, including the history and approval process of the changes and their impact on the earth science community. Symposium 5 and Theme Session 5 will give K-12 educators an opportunity to share ideas on effective teaching. The poster-format theme session Thursday afternoon will highlight K-12 teaching, while the Friday morning oral session is designed for all levels, including college teaching. Symposium 1 may also be of interest to K-12 educators.

Field Trips: Field Trip 7, all day Friday, is specifically designed by and for K-12 teachers. Field Trips 2, 6, and 10 may also be of interest.

The workshop Earth Science and Environmental Science Education—Meeting the New North Carolina Teaching Standards, held Saturday, April 7, will be led by the staff of The Science House, North Carolina State University, Science_House@ncsu.edu, (919) 515-6118. This hands-on workshop lets Earth and Environmental Science educators (grades 6–12) explore learning activities for the new North Carolina Earth and Environmental Science Requirement. The Science House is located on N.C. State University’s Centennial Campus, just minutes from the Sheraton. (Cosponsored by NSF Science and Technology Center for Environmentally Responsible Solvents and Processes and the N.C. Department of Public Instruction.) Cost: $5 if not attending meeting; free if attending meeting.

BUSINESS MEETINGS 

GSA Southeastern Section Management Board Meeting, Wednesday, April 4, 4:30–6 p.m. Larry Woodfork, woodfork@geosrv.wvnet.edu.

GSA Southeastern Section Campus Liaison Breakfast. Thursday, April 5, 6:30–8 a.m. Steve Lenhart, slenhart@radford.edu.

Paleontological Society Southeastern Section Business Meeting and Luncheon. Thursday, April 5, noon. Steve Hageman, HagemanSJ@appstate.edu.

GSA Southeastern Section Student Support Committee Meeting. Thursday, April 5, noon. Jonathan Mies, Jonathan-Mies@utc.edu.

GSA Southeastern Section Education Committee-NAGT Southeastern Section Business Meeting and Breakfast. Friday, April 6, 6:30 a.m. Pamela Gore, pgore@gpc.peachnet.edu.

GSA Southeastern Section Ph.D.-Granting Earth Science Chairs Breakfast. Friday, April 6, 7–8:30 a.m.

SEPM Southeastern Section Business Meeting and Luncheon. Friday, April 6, noon. John Anderson, janderso@gpc.peachnet.edu.

GUEST PROGRAMS 

Group tours must be arranged in advance. Even though admission to State Museums is free, we need people to sign up early so we can have the minimum number. Registration fee includes round-trip transportation from the Sheraton, plus admission if applicable. For full descriptions, see Web sites. If you would like more information, contact Chris Tacker, Christopher.Tacker@ncmail.net, (919) 715-5646, ext. 722.


J.C. Raulston Arboretum at N.C. State University. Thursday, April 5, 2 p.m. Cost $2.

Exploris (www.exploris.org/). Tickets are $4/person for a group of 10 or more. Purchase your admission at the discounted rate with your registration. Transportation will be provided for a museum visit Friday, April 6, at 9 a.m., or visit the museum at any time during the meeting.

North Carolina Museum of History (http://nchistory.dcr.state.nc.us/museums/). Friday, April 6, 1:30 p.m. Cost $1.

SPECIAL EVENTS 

Thursday, April 5, noon. Special Colloquium: Geoscience Education: Challenges and Opportunities. Presentation by Marilyn J. Suiter, National Science Foundation. $10 for professionals and $5 for K-12 educators and students; Cost includes box lunch. Subsidized by the Association for Women Geoscientists. Cosponsored by AWG, SE-NAGT, and SEGSA Education Committee.

Thursday, April 5, 8 p.m. The Best of Broadway Series presents Annie at Raleigh Memorial Auditorium. For a group of 20 or more, tickets are $15.50 (last three balcony rows), $24.50 (all other balcony seats), $33.50 (mezzanine seats) and $42.50 (orchestra). Seating charts and information at www.bestofbroadway.net/. Indicate your interest in attending the Thursday performance on your registration, and we will contact you. (Additional performances: Tuesdays–Saturdays, 8 p.m., and Saturday, 2 p.m.)

STAYING OVER? 

Please visit www.meas.ncsu.edu/segsa/ or www.geosociety.org/sectdiv/southe/01semtg.htm for information on area activities and sites of interest.

EXHIBITOR INFORMATION 

Exhibition space is available in the Oak Forest Ballroom, adjacent to the Poster Session and Registration areas. Exhibits are welcome from commercial enterprises, governmental and nonprofit agencies, colleges and universities. For more information or to reserve a space, contact Tyler Clark (919) 733-2423, tyler.clark@ncmail.net.

OTHER INFORMATION 

For more information, contact General Chair Edward F. (Skip) Stoddard, Department of MEAS, N.C. State University, Raleigh, NC 27695-8208, skip_stoddard@ncsu.edu, (919) 515-7939, or visit www.geosociety.org. Request a printout of the announcement from GSA Meetings, P.O. Box 9140, Boulder, CO 80301-9140 or (303) 447-2020, ext. 113.
GUEST PROGRAM
1. North Carolina Museum of Art ........................................ April 5 (101) $ 2 ______
2. J.C. Raulston Arboretum ........................................ April 5 (102) $ 2 ______
3. Exploris .......................................................... April 6 (103) $ 4 ______
4. North Carolina Museum of History .............................. April 6 (104) $ 1 ______

SPECIAL EVENTS
1. Geoscience Education: Challenges and Opportunities (Luncheon) April 5
   Professional (201) $ 10 ______
   K-12 Educators and Students (201) $ 5 ______

LUNCHEONS
1. GSA Southeastern Section Education Committee-NAGT SE Business Meeting
   and Breakfast .................................................. April 6 (301)
2. SEPM SE Section Business Meeting and Luncheon .................. April 6 (302)
3. Paleontological Society SE Section Business Meeting & Luncheon  April 5 (303)

FIELD TRIPS
1. Framing the Piedmont Zone ........................................ April 2–4 (401) $210 ______
2. Depositional and Structural Framework ................................ April 3 (402) $ 38 ______
3. Structural Features Exposed in Triassic Sedimentary Rocks .... April 4 (403) $ 35 ______
4. North-South Transect of the Goochland Terrane .................. April 3–4 (404) $125 ______
5. Cape Fear River Transect .......................................... April 3–4 (405) $185 ______
6. Cape Lookout Cuspate Foreland .................................... April 1–4 (406) $240 ______
7. Building Stone Use in Historical and Modern Architecture .... April 6 (407) $ 10 ______
8. Outstanding Geological Sites in the Triangle ...................... April 6 (408) $ 20 ______
9. A Temporal View of Terranes and Structures .................... April 7 (409) $ 40 ______
10. Tate-Marble Hill Window ........................................... April 7–8 (410) $140 ______
11. Building Stone Use in Historical and Modern Architecture .... April 7 (411) $ 10 ______

WORKSHOPS
1. Roy Shlemon Mentor Program in Applied Geology Student Workshop .................................. April 6 (601) $ 3 ______
2. Earth Science/Environmental Science Education
   if not attending the meeting ...................................... April 7 (602) $ 5 ______
   or free if attending the meeting ................................. April 7 (602) Free ______
GSA Foundation Update

By Morris W. Leighton, Chair, Foundation Board of Trustees

Supporting Your Science, Your Profession, Your Society

As GSA members, you probably already know that the Second Century Fund Campaign was successfully concluded last year. It raised some $10.9 million over an eight-year period, well over the $10 million goal. These funds provided significant support for GSA programs and activities, including research grants for students, publications, annual meetings, internships, mentorships, the Institute for Earth Science and the Environment, education, seminars and forums, Penrose Conferences, travel grants, distinguished awards, and the GSA building in Boulder. Much of the money went out the door in direct support of these programs and activities, as well as those of the Sections and Divisions. Nevertheless, the Foundation’s net assets still grew from $2.1 million at the end of 1992, the year the campaign began, to $6.6 million at the end of 1999, the close of the campaign. With appropriately managed investments, some 5% to 6% of the net assets can be made available each year while still preserving capital and allowing the endowment to grow.

All of this is good news, except that from an analysis of data, four points have become clear. I believe these warrant the consideration of GSA’s members, who constitute most of our donors.

First, much greater emphasis is needed on contributions to the Unrestricted Fund. Only 8% of the funds raised were unrestricted; the rest were designated for special purposes—commonly, special awards for Divisions and Sections. While these contributions are helpful for the purposes intended, we’re finding that this has led to some neglect of GSA’s core programs. That is, we’re falling short in support for research grants, publications, and meetings, and for new strategic scientific, educational, and outreach programs that will better position GSA for this century.

Incidentally, the National Science Foundation grant to GSA for partial support of the Research Grants program is scheduled to end 2001. There is no guarantee of renewal. That would mean finding an additional $30,000/year to augment this program, long a keystone of GSA’s support to students. Since the program began in 1932, some $7.2 million has gone to 6,800 recipients—an impressive figure and an indication of substantial support to our profession.

Increasing the Unrestricted Fund will help put money where it is needed. Research grants for students is one good example—the GSA Foundation Board of Trustees approved an additional $40,000 from the Unrestricted Fund for this purpose this year. Another example is the approval by the board of $27,000 from the Unrestricted Fund for matching Student Travel Grants.

Second, I want to urge members to increase their participation in supporting their Society and their profession. Less than 8% of the members contributed this past year. We could do better. I’m sure more loyal GSA members would enjoy the feeling of involvement and ownership of our Society through becoming a donor. Adding new contributors is essential to GSA’s future.

My third point is that building on what each of us contributes annually is also vital when we realize that the Second Century Fund is completed—it’s done! For the eight-year campaign, only about 50% of all the contributions came from the annual campaign and planned giving. The remainder came as direct support of the Second Century Fund. For the annual campaign and planned giving to make up the difference, we’d like to see current contributors entertain the idea of not only continuing to give what they gave to the Second Century Fund, but also increasing their contributions. This would help significantly to maintain and grow GSA programs.

My fourth point is this: We ask members to think of including the GSA Foundation as one of the charitable institutions they support annually, as well as in their estate planning. Remember, annual gifts are tax deductible, and planned giving can result in significant benefits to the programs of the Society and sizable tax advantages for your estate. I encourage you to contact the Foundation for more information about planned giving programs that best meet your needs.

Please help to get the word out. GSA needs your help to continue and improve its support of geoscience programs.

Don’t forget—your contributions to the Foundation must be postmarked by December 31, 2000, to be allowed as a tax deduction for this year.

Please help to get the word out. GSA needs your help to continue and improve its support of geoscience programs.

Digging Up the Past
Most memorable early geologic experience
Watching a nickel being pressed into molten lava from a vent on Mount Vesuvius, Italy, in the summer of 1939.
—John L. Snyder

Enclosed is my contribution in the amount of $._____. Please credit my contribution to the:

☐ Unrestricted Fund
☐ Other: ___________ Fund
☐ I have named GSA Foundation in my will.

GSA Foundation
3300 Penrose Place
P.O. Box 9140
Boulder, CO 80301-9140
(303) 447-2020
drussel@geosociety.org

PLEASE PRINT
Name ________________________________________________________________
Address __________________________________________________________________
City/State/ZIP __________________________________________________________
Phone __________________________________________________________________

GSA TODAY, December 2000

20
NATIONAL SCIENCE FOUNDATION
DIVISION OF EARTH SCIENCES
PROGRAM DIRECTOR FOR INSTRUMENTATION & FACILITIES

The National Science Foundation's Division of Earth Sciences is seeking qualified candidates for the position of Program Director of the Instrumentation & Facilities Program. This position is excepted from the competitive civil service and may be filled on a permanent basis, a 1 to 2-year visiting scientist/temporary basis, or under the provisions of the Intergovernmental Personnel Act (IPA). IPA applicants must be permanent, career employees of eligible organizations for at least 90 days prior to entering into a mobility assignment agreement with NSF and the individual’s institution. Current annual salary for the program director position ranges from $71,954 - $112,141.

Applicants must have a Ph.D. or equivalent experience in an Earth sciences field plus 6 years of successful research, research administration, and/or management experience beyond the Ph.D. in an area supported by the program. A broad general knowledge of Earth sciences research, familiarity with the U.S. scientific community and experience in an academic setting are desirable.

The Instrumentation & Facilities Program provides support for the acquisition of new research equipment or the modernization of existing equipment; the development of new instrumentation or techniques that extend current research capabilities in the earth sciences; the support of shared facilities that make complex and expensive instrument systems available on a national or regional basis; and the support of research technicians.

Interested applicants should submit a letter of recommendation and curriculum vitae to the National Science Foundation, Division of Human Resources, Attn: Myra Loyd, Room 315, 4201 Wilson Blvd., Arlington, VA 22230; and reference the following vacancy announcements:

Instrumentation & Facilities Program: Permanent Position -- EX20010027
Temporary Position -- EX20010028

For technical information call, Dr. Herman Zimmerman, Division Director, Earth Sciences, (703) 292-8550. Hearing-impaired individuals should call TDD: 703-292-8044

NSF is an equal opportunity employer.
2001 GSA Section Meetings

**NORTHEASTERN SECTION**
March 12–14, 2001
Sheraton Burlington Hotel
Burlington, Vermont

Abstract Deadline: December 5, 2000
For meeting information:
Tracy Rushmer
Dept. of Geology
University of Vermont
Perkins Hall
Burlington, VT 05405-0122
(802) 656-8136
trushmer@zoo.uvm.edu

**SOUTHEASTERN SECTION**
April 5–6, 2001
Sheraton Capital Center
Raleigh, North Carolina

Abstract Deadline: January 2, 2001
For meeting information:
Edward Stoddard
Dept. of Marine, Earth & Atmospheric Sciences
North Carolina State University
Raleigh, NC 27695-8208
(919) 515-7939
skip_stoddard@ncsu.edu

**CORDILLERAN SECTION**
April 9–11, 2001
Sheraton Universal Hotel
Universal City, California

Abstract Deadline: December 20, 2000
For meeting information:
Peter W. Weigand
Dept. of Geological Sciences
California State University–Northridge

**NORTH–CENTRAL SECTION**
April 23–24, 2001
Bone Student Center
Normal, Illinois

Abstract Deadline: January 17, 2001
For meeting information:
Robert S. Nelson
Illinois State University
Dept. of Geography–Geology
Campus Box 4400
Normal, IL 61790-4400
(309) 438-7808
rnelso@ilstu.edu

**ROCKY MOUNTAIN AND SOUTH-CENTRAL SECTIONS**
April 30–May 2, 2001
Sheraton Old Town Hotel
Albuquerque, New Mexico

Abstract Deadline: January 24, 2001
For meeting information:
John Geissman
University of New Mexico
Dept. of Earth & Planetary Sciences
203 Northrop Hall
Albuquerque, NM 87131-1116
(505) 277-3433
jgeiss@unm.edu

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**Call for Nominations**

Nominations are due soon for the following medals and awards for 2001. Don’t miss this chance to recognize your deserving colleagues for their contributions to the geosciences and to GSA. Make a note of the deadlines for nominations and send them in!

**Penrose Medal**
Deadline: February 1, 2001

**Day Medal**
Deadline: February 1, 2001

**Honorary Fellows**
Deadline: February 1, 2001

**Young Scientist Award (Donath Medal)**
Deadline: February 1, 2001

**GSA Public Service Award**
Deadline: February 1, 2001

**Distinguished Service Award**
Deadline: March 1, 2001

**John C. Frye Environmental Geology Award**
Deadline: March 31, 2001
Call for Applications!

Looking to expand your professional horizons?
Believe in serving society through science?
Ready for a unique challenge?

Apply for GSA’s Congressional Science Fellowship 2001–2002

Put your expertise and experience to work helping shape science and technology policy on Capitol Hill. Work directly with national and international leaders.

The Congressional Science Fellow will be selected from top competitors early in 2001. Successful candidates are GSA members who possess either a Ph.D. in the earth sciences or a related field, or a master’s degree in the earth sciences or a related field with at least five years of professional experience. If you possess this professional background, have experience in applying scientific knowledge to societal challenges, and share a passion for helping shape the future of the geoscience profession, GSA invites your application. The fellowship is open to U.S. citizens or permanent residents of the U.S. The deadline to apply is February 2, 2001.

To learn more about the Fellow experience, contact David Verardo, 1997–1998 GSA Congressional Science Fellow, at (703) 625-6105 or dverardo@geosociety.org.

For application information, check our Web site at www.geosociety.org/science/csf/scifello.htm or contact Karlon Blythe, Program Officer, GSA Headquarters, (303) 447-2020, ext. 136, or kblythe@geosociety.org.

CalendABF

Coal Division Offers Medlin Award

The Coal Geology Division of GSA announces the availability of the Antoinette Lierman Medlin Scholarship in Coal Geology for the 2001–2002 academic year. The scholarships provide full-time students who are involved in research in coal geology (origin, occurrence, geologic characteristics, or economic implications of coal and associated rocks) with financial support for their project for one year.

Scholarship funding can be used for field or laboratory expenses, sample analyses, instrumentation, supplies, or other expenses essential to the successful completion of the research project. Approximately $2000 will be available for the 2001–2002 scholarship award. In addition, the recipient of the scholarship may be provided with a stipend of up to $750 to present results of the project; and (3) a letter of recommendation from the student’s immediate advisor which includes a statement of financial need and the amount and nature of other available funding for the research project.

Interested students should submit five copies of the following: (1) a cover letter indicating which award(s) is (are) sought; (2) a concise statement (no more than five double-spaced pages in length, including references) of objectives and methods and a statement of how the scholarship funds will be used to enhance the project; and (3) a letter of recommendation from the student’s immediate advisor which includes a statement of financial need and the amount and nature of other available funding for the research project.

Send the material to: Peter D. Warwick, Chairman, A. Lierman Medlin Scholarship Committee, U.S. Geological Survey, 956 National Center, Reston, VA 20192, (703) 648-6469, pwarwick@usgs.gov.

The proposal and letter of recommendation must arrive no later than February 15, 2001. Applicants will be notified of the Scholarship Committee’s decision by April 1, 2001.

This scholarship was established as a memorial to Antoinette “Toni” Medlin who for many years dedicated her efforts toward the advancement of coal geoscience and to the encouragement of students in coal geology. Monies for the scholarships are derived from the annual interest income from the scholarship fund.
Engaging “My Neighbor” in the Issue of Sustainability

Part XII: We Have the Option of Choice: The Future is Up to Us

E-an Zen, Reston, VA; A.R. Palmer, Boulder, CO; and P.H. Reitan, Buffalo, NY

In this series of essays, we have focused on key elements that comprise the issue of sustainability—the central issue that faces humanity in the 21st century. It should be abundantly clear that to continue as if the world has unlimited resources to support an expanding economic system, and unlimited space for all life forms in addition to humans, is to invite the calamity of a ruined environment and exhaustion of many key resources, which would affect the ecosystem of which we are an integral part. Because we all share the global commons, we will also all share the consequences of such a calamity (Hardin, 1968; Palmer, 2000).

Our future thus hangs in the balance. But we humans have one thing going for us: We are sentient and reasoning beings; we have the gifts of vision, of imagination, and of social structures that allow concerted action. Unlike other life forms that inhabit Earth, we can choose to make a difference in our future. We can choose to change the focus of our value systems and emphasize stewardship rather than exploitation of the global commons. Collectively, we humans can significantly improve our prospect for an enduringly habitable world.

How to bring about the necessary changes? This series of articles has advocated that we and “our neighbors” should become aware of the major issues of sustainability, and consider constructive action. Social changes, to be beneficial and sustainable, must be carefully evaluated and made, in our political system, by common consent. They should be reversible, lest things not go as intended; they should probably be locally based, so as to improve communication among stakeholders and reduce the risk of failure through lack of understanding and support (AtKisson, 1999; National Research Council, 1996).

To do that, however, we must agree on the needed changes in the way we think and conduct our lives, and we must act on our resolutions on the basis of both enlightened self-interest and altruism (Palmer, 2000; Zen, 2000; Fisher, 2000; Meadows et al., 1992; Kates, 2000; Earth Charter, 2000). Here, we suggest a need to reexamine some of our entrenched values and attitudes, such as:

- economic growth as an innate virtue and as an adequate index of social health;
- indefinite extension of human life expectancy as a virtue even though it aggravates the population problem;
- conspicuous consumption, rather than frugality, as the socially desirable norm of behavior;
- equating change with human progress, with its corollary that what humans can change, humans should change;
- equating a more opulent material life with an intrinsic improvement in the standard of living;
- assuming that science and technology are adequate to fix the problem for society; and
- assuming that humans have a license to exploit and use the non-human world with little or no ethical restraint.

Howe homeowners maintain their houses in such a way as to minimize the risk of fire. They do not wait until after their home burns before buying a fire insurance policy. A faulty electrical system in a home may be a real fire hazard; repairing the system immediately may prevent a catastrophe. Working toward sustainability—preservation of the global ecosystems—is analogous to reducing the fire hazard. For sustainability, however, the insurance policy is to prevent or mitigate damage rather than to indemnify victims after the damage.

A year ago, the world engaged in a large-scale exercise to verify compliance of computer codes with the “Y2K” turnover so as to prevent a massive collapse of systems of electronic information, data storage, and services that people perceive as useful to their ways of living. Although the consequences of such a failure would be miniscule compared to the consequences of failing to achieve sustainability, stakeholders invested billions, perhaps hundreds of billions of U.S. dollar equivalents to ensure Y2K compliance, by and large willingly.

Choosing to pursue a sustainable future through stewardship of the global commons will at times require us to give up some cherished ways of doing things and may be personally painful. Sustainable human societies cannot be brought about through coercion, but through people seeing a need and willingly acting upon it. In our political system, this will mean having informed citizens who by their votes and their buying power will support courageous political and business leadership in this transformation (Ashby, 1993).

To be motivated to move toward new and sustainable patterns of behavior requires recognition that the danger is real but the goals and aspirations of individuals and of societies can be moderated. Because sustainable human societies are inseparable from healthy earth systems, humans must accord value to the nonhuman world as well. Science, environmental philosophies, and religions (Fisher, 2000), though different in many ways, can come together in support of stewardship of the earth system. We need to seek out common ground and cultivate ways to work together toward this enterprise of global sustainability. Surely this work will constitute the most important insurance policy we could ever buy.

References Cited


Note: This series of essays, with some enhancements for teachers, is now available through a link on GSA’s Web site, www.geosociety.org. From either Public Interest or the “Related Links” area of Geosciencesinitatives, click “Sustainability” then “Toward a Stewardship of the Global Commons.”
**Position Announcements** (from employers using GSA's Employment Service at the 2000 Annual Meeting)

**J UNIATA COLLEGE, HUNTINGDON, PA**

**ASSISTANT PROFESSOR OF GEOLOGY**

The Department of Geology at J unidata College invites applicants for a tenure-track position at the Assistant Professor level beginning August 2001. The successful applicant will be expected to teach courses in introductory geology, geological and paleontological field methods, and upper level courses in environmental geology. Faculty are committed to diversity within its academic community. This is an equal opportunity/affirmative action employer.

**UNIVERSITY OF ALASKA ANCHORAGE**

**ASSISTANT PROFESSOR, GEOLOGY**

Applications are invited for a tenure-track position at the level of Assistant Professor (open specialty) in the Department of Geology, University of Alaska. Qualifications include a Ph.D., a proven record of obtaining external funding, recent refereed publications, and a commitment to conduct research at the undergraduate and graduate (Masters) level. The department seeks to add an exceptional individual who can increase graduate student enrollment by establishing an energetic, externally funded research program. Candidates are preferred whose research is closely related to our interdepartmental and external research theme built around investigations of the "Terrestrial Record of Quaternary Environmental and Climatic Change." Applicants are encouraged to review faculty profiles at [http://www.uakron.edu/earthsci](http://www.uakron.edu/earthsci). UAkron is an equal opportunity/affirmative action employer.

**UNIVERSITY OF ALASKA ANCHORAGE**

**ASSISTANT PROFESSOR—GLOBAL CHANGE GEOSCIENCES, University of Alaska Anchorage**

Applications are invited for an open specialty position at the level of Assistant Professor (open specialty) in the Department of Geology, University of Alaska. Qualifications include a Ph.D., a proven record of obtaining external funding, recent refereed publications, and a commitment to conduct research at the undergraduate and graduate (Masters) level. The department seeks to add an exceptional individual who can increase graduate student enrollment by establishing an energetic, externally funded research program. Candidates are preferred whose research is closely related to our interdepartmental and external research theme built around investigations of the "Terrestrial Record of Quaternary Environmental and Climatic Change." Applicants are encouraged to review faculty profiles at [http://www.uakron.edu/earthsci](http://www.uakron.edu/earthsci). UAkron is an equal opportunity/affirmative action employer.

**CLIMATE-HYDROSPHERE-LANDSURFACE INTERACTIONS**

The Department of Earth Sciences at Boston University (B.U.) invites applications for a tenure-track faculty position at the Assistant Professor level, to begin September 1, 2001. The successful applicant will have research interests related to our interdepartmental and external research themes such as geochemical and paleoclimatic reconstructions from terrestrial, ice, or marine records; paleoclimate, paleoceanography, and other related research. Applicants must possess a Ph.D. at the time of appointment and be expected to supervise graduate research at the M.A. and Ph.D. levels. Boston University is an equal opportunity/affirmative action employer.

**ASSISTANT PROFESSOR**

**STRUCTURAL GEOLOGY**

The Department of Geosciences at University of California, Berkeley invites applications for a tenure-track position in structural geology. The successful applicant will be expected to teach courses in structural geology, hydrology, and upper level courses in environmental geology. Faculty are committed to diversity within its academic community. This is an equal opportunity/affirmative action employer.

**ASSISTANT PROFESSOR**

**UNIVERSITY OF ALASKA ANCHORAGE**

**ASSISTANT PROFESSOR, GEOLOGY**

Applications are invited for a tenure-track position at the level of Assistant Professor, applicants who have established an internationally recognized research program may be considered for a full-time, tenure-track position at the Assistant Professor level, to begin September 1, 2001. The successful candidate will be expected to teach courses in introductory geology, geological and paleontological field methods, and upper level courses in environmental geology. Faculty are committed to diversity within its academic community. This is an equal opportunity/affirmative action employer.
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LETTERS

My compliments to Bottjer et al. (2000) for their thoughtful and stimulating discussion of changes in level-bottom fossil communities near the Proterozoic-Cambrian transition! However, in addition to the changes on or in siliciclastic substrates enumerated by them, there was another contemporaneous substrate revolution involving: (a) increased diversity of reef-building taxa; part of the well-documented "Cambrian explosion" of skeletal metazoans; and (b) a switch in growth habit and/or direction and growth forms and/or shapes among reef-building taxa from mostly subhorizontal, microbial mats or sheets (stromatolites) to densely packed skeletal tubules (Epiphyton), coccoids (Renalcis) and erect cups or bowls and sticklike cylinders or cones of the early Archaeocyatha.

In contrast to the frameless Precambrian reefs built exclusively by soft-bodied microbes, the Cambrian reef revolution produced the earliest reefs with skeletal frameworks (Kruse et al., 1995). The nearly simultaneous appearance of weakly skeletonized Epiphyton, Renalis (both calcimicrobes), and Archaeocyatha (Porifera) characterized the abundant and diverse Early Cambrian fossil reef communities.

Furthermore, the nearly coincident increase in packing density of calcimicrobes and clonal Archaeocyatha provided sufficient skeletal volume and rigidity to build the initial self-supporting reef framework. Accompanying this truly revolutionary increase in morphologic diversity, skeletonization, packing density and erect clonal growth, there also was a progressive increase in the complexity of reef guild structures from the Precambrian through the Early Cambrian (Fagerstrom, 1986, p. 325–331).

In summary, the Cambrian substrate experienced revolutions on or in siliciclastic detrital sediments as well as in the building of small, topographically elevated carbonate reefs with skeletal frameworks. The appearance of skeletal reef substrates was at least as profound as the revolution described by Bottjer et al. (2000).

References Cited


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Bottjer et al. reply: In our paper we outlined the changes in seafloor character that occurred due to the evolution of increasing vertically directed bioturbation. Thus, shallow seafloors in the late Neoproterozoic which had been microbial mat-dominated were largely replaced in the Cambrian and post-Cambrian by seafloors with a surface mixed layer, a change that has been called the agronomic revolution. This change in benthic substrates strongly impacted metazoans adapted to mat-dominated seafloors and yielded profound long-term evolutionary and ecological effects that we have termed the Cambrian substrate revolution.

Fagerstrom has aptly summarized contemporaneous changes that were occurring in carbonate buildups. These were largely due to changes in microbial communities and inclusion of skeletal metazoans. Yet, still more work is needed to understand the response by early metazoans to the change from substrates largely physically structured by microbial mat-forming communities to those altered by the activity of other metazoans. For example, the earliest crustaceans are hypothesized to have evolved in the late Neoproterozoic and were likely relatively small (Walossek, 1999). Thus, one can ask, How did interacting with a seafloor structured by microbial mats affect the early evolution of the Crustacea, and how did they later respond as part of the Cambrian substrate revolution? Where appropriate, similar questions must be asked of other early metazoan clades.

Until recently we had only begun to scratch the surface on understanding the evolutionary and environmental context for the early evolution of metazoans. However, a variety of pieces of the puzzle are falling into place, making this one of the most exciting fields of inquiry in geobiology today.

References Cited


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DRI, an internationally recognized environmental research institution and a component of the University and Community College System of Nevada (UCCSN), invites applications for the position of Executive Director for our Division of Hydrologic Sciences (DHS). Reporting to the President, the Division Director promotes the needs of DHS faculty; serves as faculty mentor and collaborator; facilitates teaching and research with related departments at UCCSN's two teaching campuses and interacts with current and potential sponsors to further the strategic goals of DHS and the Institute.

The Executive Director we are seeking will bring to DRI a strong scientific background, with proven leadership, communication, administrative, and personnel skills. The Director will identify and pursue research opportunities relevant to the interests and capabilities of the faculty; represent the research of the faculty to constituencies both within and external to the Institute; develop, in close collaboration with the faculty, a research vision and science plan; work with the Vice President of Academic Affairs to facilitate teaching opportunities for the Division's faculty; and foster interdisciplinary research across the three divisions and two interdisciplinary centers of DRI, with the other campuses of the UCCSN, and other organizations.

With campuses in Las Vegas and Reno, DHS has 50 faculty and support staff, 37 graduate research assistants and hourly employees, and an annual research budget from contracts and grants of ~$6M. The Division's diverse research, basic and applied, includes integrating physical, chemical, and biologic processes in emerging disciplines such as global environmental hydrology, climate change, and complex watersheds; as well as traditional disciplines including groundwater hydrology and hydraulics; hydraulic engineering and surface water hydrology; contaminant transport in both surface and subsurface systems; geochemistry; and snow, ice, and unsaturated zone hydrology.

DHS research includes a cross-disciplinary science and engineering contract with the DOE office in Las Vegas, and grants and contracts from NSF, other federal agencies, state and local governments, and foundations.

For a complete description of the Director's responsibilities, and the application requirements and process, please visit us at www.dri.edu.

DRI is an AA/EEO employer; we hire only U.S. citizens and those authorized to work in the U.S.
Positions Open

THE METROPOLITAN STATE UNIVERSITY OF DENVER, DENVER, COLORADO
ENVIRONMENTAL SCIENTIST
FULL TIME TENURE TRACK POSITION
QUALIFICATIONS: Required: Ph.D. in Environmental Geology, Environmental Education, Geography or Geology, and the ability to use educational technology. Preferred: Preference will be given to those candidates who provide evidence of effective teaching. Successful candidates will be able to teach an undergraduate class-room teaching, including interdisciplinary teaching and curriculum development. 2) field work/experience in the western region, and (3) knowledge of and hands-on experience with current, relevant applications of GIS and geologic software.
RANK & SALARY: Commensurate with education and experience.
Interested applicants should call (303) 556-3143 or go to our Web site at http://www.msudenver.edu for a detailed position description and application process.
DEADLINE: Screening begins January 15, 2001, and continues until interviews are scheduled.
Pursuant to Colorado Open Records Law, written materials in a search process may be open for inspection by the public. The Metropolitan State College of Denver is an equal opportunity employer.

ENVIRONMENTAL GEOLGY
LYNCHBURG COLLEGE
The School of Sciences at Lynchburg College in Virginia invites applications for the position of an Assistant Professor, tenure track. Teach/develop upper level geology/environmental courses, teach jointy freshmen earth/environmental science course, supervise student research projects, and develop external consulting projects. Strong knowledge of Virginia geology, soils, and ground-water issues is desirable. Ph.D. in Geology, Environmental Science, or related discipline required. Teaching experience preferred. Please visit Web site: http://www.lynchburg.edu/science positions for more detailed information. Send letter of application; curriculum vitae; teaching philosophy and experience; plans for continued professional development; and a list of three references, along with their e-mail addresses, mailing addresses, and telephone numbers to: Lynchburg College, Attn: James E. Carico, Dean, School of Sciences, 1501 Lakeside Drive, Lynchburg, VA 24501 USA. Review of applications will begin immediately and continue until position is filled. Lynchburg College is an Equal Opportunity Employer.

MINERALOGY OR CARBONATE GEOLOGY
NORTHERN ILLINOIS UNIVERSITY
The Department of Earth and Environmental Geosciences solicits applications for a tenure-track assistant professor position, with specialization either in carbonate geology or in mineralogy, to begin in August 2001. Candidates in in carbonate and environmental geology who are particularly interested in a mineralogist or biochemist who would utilize the Advanced Photon Source at nearby Argonne National Laboratory and who will develop multidisciplinary research that integrates with any of our existing programs in environmental geochemistry/hydrogeochemistry, petrology, and mineralogy. Northern Illinois University is an equal opportunity/affirmative action employer; qualified women and minorities are especially encouraged to apply. NIU is an equal employment opportunity/appointment position.

VACANCY: GEO-MICROBIOLOGIST
U.S. GEOLOGICAL SURVEY VAA 20192
The U.S. Geological Survey seeks applicants for a Ph.D. geo-microbiologist position to work on the roles of microorganisms in the cycling of metals in near-surface environments, and to conduct research in the broad area of metal-organic matter interactions and aqueous-metal release. We desire applicants who are broadly interdisciplinary in their approach to geobiology and a broad range of geological sciences. Present focus is on providing research linkages with active areas of multidisciplinary work including surface mineralogy and toxic-metal cycling processes (As, Hg). The ideal candidates would have experience in biogeochemistry and bio-mineralogical research, and an ability to identify microorganisms in geological materials and determine microorganism abundance, diversity, and mineral association involved with metal release, transport, and fixation processes. Candidates will also examine basic mechanisms in the formation of weathering products in near-surface environments. Successful candidates will utilize molecular biological approaches to identify and examine microorganisms from these environments. Applicants are sought with skills and experience in the following areas: (a) microbiology and molecular biological techniques and diagnostic bacterial methods, including microbiological field methodologies and established laboratory techniques; (b) geochemistry, mineralogy, organic geochemistry, and hydrominingology; (c) techniques for isolation of microorganisms from geological materials; and (d) microbial remediation techniques and how geologic systems support microorganism proliferation. Successful candidates will utilize a description of their teaching philosophy and research interests, curriculum vita, and evidence of experience in teaching and research. Women and minorities are especially encouraged to apply. NIU is an equal employment opportunity/appointment position.

HYDROLOGIST/HYDROGEOLOGIST
SOUTHERN CONNECTICUT STATE UNIVERSITY
The Earth Science Department at Southern Connecticut State University (http://www.scsu.ctstateu.edu) invites applications for a new tenure track position at the assistant professor level beginning August 2001. The Ph.D. is required at the time of appointment. We seek a broadly educated, college, field-based geoscientist with specialization in hydrology/hydrogeology who is interested in teaching and graduate education. Teaching responsibilities may include introductory geology lecture and laboratory, hydrology, groundwater, and environmental geology. Candidates with interests in encouraging undergraduate research are particularly suitable. A willingness to participate in a potential summer field program and to teach occasional evening courses is preferred. The Computer Science Department is a comprehensive earth sciences department with full-time faculty who support a broad-based curriculum with a comprehensive earth sciences department with five full-time faculty who support a broad-based curriculum with a comprehensive earth sciences department with five full-time faculty who support a broad-based curriculum with a comprehensive earth sciences department with five full-time faculty who support a broad-based curriculum with a comprehensive earth sciences department with five full-time faculty who support a broad-based curriculum with a comprehensive earth sciences department with five full-time faculty who support a broad-based curriculum with a comprehensive earth sciences department with five full-time faculty who support a broad-based curriculum with a comprehensive earth sciences department with five full-time faculty who support a broad-based curriculum with a comprehensive earth sciences department with five full-time faculty who 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Three Faculty Positions
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The Department of Geological Sciences at the University of Texas at Austin seeks applicants for three tenure-track positions at the level of Assistant Professor.

GLOBAL CHANGE/EARTH SYSTEM SCIENCE. This position is the first of three anticipated faculty hires in Global Change/Earth System Science in the areas of climate/paleoclimate modeling, remote sensing, climate analysis, and field experimentation. This first hire will be in climate/paleoclimate modeling, but exceptional candidates in the other areas are encouraged to apply. Areas of expertise may include, but are not limited to, climate variability and dynamics over geologic and/or human time scales, land-surface processes and biosphere-atmosphere interaction, and the global water and/or carbon cycles. Opportunities exist to interact with existing strengths on campus, including modeling and remote sensing of the land-ocean-atmosphere-ice system, and the geologic and ecological records of global change. Additional opportunities for collaboration exist through the UT Institute for Geophysics, and the newly-formed, interdisciplinary Environmental Science Institute.

IGNEOUS PETROLOGY. Two faculty positions are anticipated in the area of petrology and high-T geochemistry. For this first hire, we seek an igneous petrologist who integrates field-based investigations and modern analytical methods in the study of igneous processes and their relation to fundamental geologic problems. This person will complement existing strengths in metamorphic petrology, isotope geochemistry, and structural geology. The Department houses superb analytical facilities, including a new multicollector LA-ICP-MS; a high-resolution X-ray CT scanner; modern electron microprobe, SEM and XRD facilities; and clean labs and instrumentation for stable and radiogenic isotope geochemistry.

EXPLORATION GEOPHYSICS. This faculty position is part of our initiative to establish a premier program in exploration geophysics. Most graduates of this program enter careers in the petroleum exploration and production industry. Collaboration is expected with the UT Institute of Geophysics, the Bureau of Economic Geology, and the Texas Institute of Computational and Applied Mathematics. New facilities supporting the exploration geophysics program include the 3D Seismic Interpretation Laboratory with state-of-the-art interactive workstations and a high-speed storage area network for examining very large volumes of three-dimensional seismic data. Facilities and programs at BEG and UTIG include multi-component land seismic capabilities, multi-channel marine 3-D seismic capabilities, and extensive geological, geophysical and reservoir engineering projects all over the world.

Successful candidates will join a large, diverse and active geoscience department with superb research support and strong ties to allied organized research units at the University. They will be enthusiastic teachers of introductory courses and courses for undergraduate and graduate majors, direct the research of MS and PhD students, and conduct vigorous externally funded research programs. The anticipated starting date for all positions is August 2001; a Ph.D. is required at the time of appointment. Please see http://www.geo.utexas.edu/facultysearches for additional information.

To apply, please send a curriculum vitae, statements of research and teaching interests, and the names and contact information for five references to:

Faculty Searches, Department of Geological Sciences,
The University of Texas at Austin, Austin, Texas 78711.

Review of applications will begin December 1, 2000, and will continue until positions are filled. The University of Texas at Austin is an Equal Opportunity/Affirmative Action employer.

Send letter of application, vitae, transcripts (copies acceptable) and three current letters of recommendation to: Dr. Paul Ryberg, Chair, GIS Search Committee, AGES Department, Clarion University, Clarion, PA 16214.

Review of complete applications will begin January 31, 2001, and will continue until the position is filled. Clarion University is building a diverse academic community and encourages minorities, women, veterans, and persons with disabilities to apply. AA/EOE.

TENURE TRACK FACULTY POSITION
SILICICLASTIC SEDIMENTOLOGIST/STRATIGRAPHER

The Department of Geology and Geophysics at Texas A&M University invites applications for a tenure-track appointment at the Assistant Professor level in siliciclastic sedimentology/stratigraphy. Review of applications will begin January 15, 2001, with an anticipated starting date of August 2001.

The successful candidate is expected to teach at both graduate and undergraduate levels and will develop and conduct an externally funded research program. A Ph.D. is required by the time employment begins.

The specific research field of the successful candidate is open, although experience in petrographic and facies analyses, modern stratigraphic studies, and basin-scale studies is desirable. The ideal candidate should be interested in developing ties with the petroleum industry. Expertise with quantitative approaches to sedimentology/stratigraphy is also desirable. We seek an individual who will complement existing laboratory programs in basin studies, environmental studies, global change and paleoclimate, petroleum geosciences, reservoir characterization, sedimentary geochemistry, seismic interpretation, sequence stratigraphy, and tectonics and sedimentation. Significant opportunities also exist for the successful candidate to interact with colleagues in the Department of Petroleum Engineering, Geography, and Oceanography and geoscientists at the Ocean Drilling Program. For additional information about the Department of Geology & Geophysics at TAMU and research facilities, please check our Web site at http://geoweb.tamu.edu.

Submit a curriculum vitae, selected reprints, a statement of research and teaching interests, and a list of at least three references with postal addresses, phone and fax numbers, and e-mail addresses to: Dr. Steven L. Dorobek, Chair, Siliciclastic Search Committee, Department of Geology & Geophysics, Texas A&M University, College Station, TX 77843-3115. Women and members of minority groups are especially encouraged to apply.

Texas A&M University is an affirmative action/equal opportunity employer committed to diversity.

MINERAL PHYSICS FACULTY POSITION

The Department of Earth and Space Sciences (ESS) and Institute of Geophysics and Planetary Physics (IGPP) at the University of California Los Angeles (UCLA) invite applications for a ladder faculty position in mineral physics, including such specialties as flow laws, equations of state, phase relations, anisotropic elasticity, and/or thermal and electrical conductivity. Consideration will be given to both experimental and computational approaches. Necessary qualifications include the Ph.D., demonstrated intellectual leadership and teaching skill, and laboratory and/or computational experience. The ability to conduct investigations at high pressure and/or on multicomponent rocks are desirable. The level of appointment will be commensurate with experience and distinction, but a junior appointment is preferred. Joint appointment to the IGPP can be made for scientists involved in novel research fields that cross traditional disciplinary boundaries. The applicant should encode a curriculum vitae, publication list, short statement of teaching and research objectives, and names and addresses of three potential references. Applications should be directed to: Mineral Physics Search Committee, Department of Earth and Space Sciences, University of California, P.O. Box 951567, Los Angeles, CA 90095-1567.

Applications will be accepted on a continuing basis, but consideration of documents will commence January 15, 2001. UCLA is an equal employment opportunity/affirmative action employer; women and minority candidates are particularly encouraged to apply.

ASSISTANT PROFESSOR/PETROLOGIST
SAN DIEGO STATE UNIVERSITY

The Department of Geological Sciences at San Diego State University invites applications for a tenure-track Assistant Professor position in the general area of petrology starting Fall 2001. A Ph.D. is required at the time of appointment. We seek outstanding applicants with the potential to establish vigorous, externally-funded research programs involving M.Sc. and B.S. students. We are particularly interested in multidisciplinary scientists with field-based interests who can collaborate with other research programs in the department. Prior teaching experience, research grant activity, and familiarity with operation and maintenance of analytical instrumentation is desirable. Teaching responsibilities will include both lower and upper division courses in petrology/mineralogy as well as graduate courses in the individual’s field of expertise. Starting salary range is $40,484 to $51,010 depending on experience.

Send letter of application, vitae, transcripts (copies acceptable) and three current letters of recommendation to: Dr. Paul Ryberg, Chair, GIS Search Committee, AGES Department, Clarion University, Clarion, PA 16214.

Review of complete applications will begin January 31, 2001, and will continue until the position is filled. Clarion University is building a diverse academic community and encourages minorities, women, veterans, and persons with disabilities to apply. AA/EOE.

TEXAS A&M UNIVERSITY
G. FAURE, Ohio State University, Columbus, OH

ORIGIN OF IGNEOUS ROCKS
The Isotopic Evidence
The origin of different kinds of igneous rocks can be understood in terms of the tectonic setting in which they form and the isotopic compositions of strontium, neodymium, and lead they contain. This book explains the petrogenesis of igneous rocks as a consequence of tectonic processes resulting from interactions between asthenospheric plumes and the overlying lithospheric mantle. The relevant principles of isotopic geochemistry are explained making this book accessible to university students as well as to professionals. The relevant isotopic data are presented in a diagnostic form. In addition, the text avoids the use of acronyms.
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Send a letter of application describing teaching and research interests, curriculum vitae, and the names, addresses, and telephone numbers of three references to: Dr. C.E. Nehru, Chairperson, Brooklyn College, CUNY, Department of Geology, Room 3131 N, Brooklyn College, CUNY Graduate Center, 2999 3rd Avenue, New York, NY 10021-6000, phone: (212) 741-2223; fax: (212) 741-2241; e-mail: cee@brooklyn.cuny.edu.

The Department of Geological Sciences at the University of Pennsylvania invites applications for a tenure-track faculty position in environmental geoscience. The candidate may join established research programs in paleoclimate, sedimentary geology, paleoecology, and/or geologic engineering, or may pursue some other aspect of environmental geoscience.

The successful candidate will be expected to maintain an active research program while teaching graduate courses in his/her research specialty to Ph.D. candidates and to undergraduate and graduate students (Masters) and to collaborate, where possible, with other faculty members in the department and with appropriate faculty in other departments. Vanderbilt is a major research university with a small but active geoscience program. For more information about the department and university visit our Web site at: http://geo.cas.vanderbilt.edu.

Applicants should submit resumes, statements of research and teaching interests, and letters from three references to: Dr. K. Y. Kuroda, Vanderbilt Department of Earth & Environmental Sciences, Nashville, TN 37235; phone: (615) 322-2158; fax: (615) 322-2138; e-mail: dkimbrough@geology.sdsu.edu.

The deadline for receiving applications is January 10, 2001. Inquiries may be e-mailed to dkimbrough@geology.sdsu.edu. Selections in December 2000; the search will remain open until qualified candidates are hired.

Department of Geological Sciences
University of Texas at El Paso
El Paso, Texas 79968-0555, phone: (915) 747-6424, fax:915-747-5073, e-mail: miller@geo.utep.edu.

We will begin reviewing applications on January 15, 2001, and will accept applications until the position is filled. The University of Texas at El Paso is an equal opportunity/affirmative action employer and does not discriminate on the basis of race, religion, national origin, sex, marital status, age, or disability.

ENVIRONMENTAL GEOSCIENCE UNIVERSITY OF PENNSYLVANIA

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Geology in the Forests

2000 marks the first year of Geology in the Forests, an intern and mentor partnership between GSA and the Pacific Southwest Region (Region 5) of the U.S. Department of Agriculture Forest Service. Geology in the Forests pairs GSA student members with practicing Forest Service geologists. In this cooperative program, the Forest Service received high-caliber assistance in accomplishing their work programs. GSA found a source of intern positions in applied geology for student members. And, the interns were able to apply their knowledge of geology to the principles of multiple-use and ecosystem management. This year’s interns worked with their respective Forest Service geologist mentors for 10 weeks.

Brian Seneker has a degree in biology and is working on a second degree in geology at Montana State University in Bozeman, Montana. He worked with mentor geologist Allen King on the Los Padres National Forest. Seneker used air photos to map landslide-prone areas, assessed and summarized data on abandoned landfills, and developed an interpretive brochure on the geology of the Santa Cruz Trail. King was impressed with Seneker’s initiative and ability to take a complex project from an idea to completion. This involved fieldwork, map editing and creative writing, working with multiple groups to acquire funding, and producing the final artwork for the brochure. Of the interpretive brochure, Seneker comments, “I think that the greatest challenge of this project (aside from the time limitations) was to create interesting and correct text for the average hiker to understand and enjoy. I learned much about the working world of geology that cannot be taught in school, and this knowledge has instilled in me the motivation and confidence to pursue a career in the geological sciences.”

Ann Finocchio, a senior at Radford University in Virginia, worked with Forest Service mentors Alan Gallegos and Jerry DeGraff on the Sierra National Forest. Finocchio collected temperature data at Mono Hot Springs, monitored the Camino Meadow Restoration Project, and developed information for a geology Web site on the Courtright Intrusive Zone Geologic Special Interest Area. Finocchio primarily worked on a project to provide geologic information for the High Sierra Lakes Monitoring Project, researching and determining the bedrock geology for 132 watersheds distributed throughout the Sierra Nevada. Finocchio also acted as a mentor for Ibeth Avila, a recent high school graduate whose dream is to be a geologist. Finocchio and Avila flew in a helicopter to reconnoiter the geology of the American River and rode horseback into the Kaiser Wilderness to collect water samples for the High Sierra Lakes Project. Gallegos and DeGraff were impressed with Finocchio’s abilities as a geologist and encouraged her to consider a career in the Forest Service. “With only one semester to complete before graduation and little exposure to practical applications of geology, I really wanted an example of how geologists apply their skill in the real world,” Finocchio said. “There is an advantage in the Forest Service program in that you work closely with your mentor the whole summer. Each day is a geological experience, like a constant 10-week answer to the question, What do geologists do? Interdisciplinary teams are a staple in Forest Service work. I had the chance to work with biologists, archaeologists, engineers, ecologists, botanists, statisticians, and hydrologists on several projects and attend meetings in which they took part. I learned a lot from each of them.”

Jaime Piver, a senior at Southern Oregon University, worked with mentors Juan de la Fuente and Polly Haessig on the Klamath National Forest. Piver interpreted aerial photos for the Horse Creek Non-System Road Inventory and the Siskon Mine Tailings Project and interpreted satellite imagery for the 1997 Landslide and Flood Assessment. De la Fuente was impressed with Piver’s ability to quickly grasp an assignment and work hard with limited supervision. Piver prepared and interpreted aerial photos for geologic work and learned the value of having geographic information system (GIS) skills to prepare geologic maps. “The Horse Creek project was my first real experience using aerial photos and a stereoscope,” Piver said. “It took a couple of days before I was even able to see in stereo, then came the task of trying to identify landslides. This was not an easy task. After mapping was complete, I began to digitize my work. I had taken a GIS class, but I had not worked with Arc Info until this summer. After I finished digitizing, I was able to use a satellite image of the forest to fill in areas where air photos were not available. The satellite image was incredibly interesting to work with and enabled me to draw the required technical conclusions.”

Final reports from these interns are posted on GSA’s Web site, www.geosociety.org, in the Professional Development section. If you are interested in applying for an internship position for 2001, plan to take a look at the position descriptions available on the site late this month. Applications are due February 1, 2001. For more information, contact Katie Keller Lynn, (303) 447-2020, ext. 194, kkellerlynn@geosociety.org. See pages 36-38 for more on GSA’s internship programs.
The Department of Geological Sciences at the University of Texas at Austin seeks applicants for an open-rank tenure or tenured faculty appointment. The successful candidate will be expected to develop a research program that will generate funding to support the program and graduate student involvement. The successful candidate will be teaching introductory geology courses along with courses related to his/her specialty and will be expected to develop and teach M.S. and graduate courses. He/she should also be willing to participate in teaching a capstone summer field camp course.

Questions should be directed to Prof. Kirkpatrick (217-333-7414; kirkpat@uiuc.edu). Nominations and applications should be submitted by January 10, 2001; however, applications will be accepted until the position is filled. Please send all materials to: Assistant Professor Search Committee, Department of Geology, University of Illinois, 1301 West Green Street, Urbana, IL 61801.

The Department of Geology at the University of Illinois, Urbana-Champaign, invites nominations and applications for an open-rank tenured or tenure-track faculty appointment in surficial geology to begin August 21, 2001. A tenured appointment carries the title W. Hilton Johnson Professor or Associate Professor of Geology. Specialties of interest include, but are not limited to geomorphology, neotectonics, and surficial geology. Applicants must demonstrate an ability to build excellence in education and research and to show a commitment to building a vibrant research and teaching program that emphasizes quantitative approaches to evaluating these topics. Women and minorities are encouraged to apply.

Questions about the position can be directed to Prof. Kirkpatrick (217-333-4144; kirkpat@uiuc.edu). Nominations and applications should be submitted by January 10, 2001; however, applications will be accepted until the position is filled. Please send all materials to: Assistant Professor Search Committee, Department of Geology, University of Illinois, 1301 West Green Street, Urbana, IL 61801.

The University of Illinois at Urbana-Champaign is an affirmative action, equal opportunity employer and women and minorities are encouraged to apply.

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statement of teaching and research objectives, and names and addresses of three references. Applications should be directed to: Planetary Science Search Commit-tee, Department of Earth and Space Sciences, University of California, P.O. Box 95167, Los Angeles, CA 90095-1567. The search will commence on January 15, 2001. UCLA is an EOA equal opportunity/affirmative action employer.

UNIVERSITY OF TORONTO AT SCARBOROUGH PHYSICAL SCIENCES DIVISION - ENVIRONMENTAL SCIENCE

Applications are invited for a tenure track faculty position in Environmental Sciences at the University of Toronto at Scar-borough, Division of Physical Sciences. The appointment, at the Assistant Professor level, would be effective starting July 1, 2001, or as soon as possible thereafter. A completed Ph.D. is required. Successful candidate will have teaching and research interests in Soil Science, with ancil-lary teaching and research interests in one or more of the following: hydrology, chemistry, Soil or Sediment Contamination/Remediation; Soil Mineralogy. Candidates should send their curriculum vitae, state-ments of teaching specializations and research interests, and arrange to have letters from three referees forwarded before December 31, 2000, to: Professor JAMES THOMPSON, Chair, Division of Physical Sciences, University of Toronto at Scarborough, Scarborough, ON., M1C 1A4. Phone: 416-287-7197; fax 416-287-7204; e-mail: jthompson@scar.utoronto.ca.

In accordance with our Employment Equity Policy, the University of Toronto encourages applications from qualified women and men, members of visible minorities, aboriginal peoples, and persons with disabilities.

VIRGINIA TECH, GEOLGY

The Department of Geological Sciences at Virginia Polytech-nic Institute and State University invites applications for a tenure-track Assistant Professor in Geology. Applicants must hold a Ph.D. degree in Geology or related field. Preference will be given to candidates with a strong back-ground in paleontology (including micropaleontology), excel-lent quantitative skills, and a commitment to interdisciplinary training. The applicant should have a strong commitment to under-graduate and graduate education. Interested applicants should send a letter of interest, cur-riculum vitae, copies of transcripts, names and contact information of three references, statement of anticipated research and teaching interests along with a short essay explaining where the applicant would like to see him/herself within the geosciences in the future. Applicants should send their application package to Professor Fred Read, Geobiology Search Committee, Department of Geological Sciences, Virginia Tech, Blacksburg, VA 24061; Phone: 540-231-6984; Fax: 540-231-3386; email: wiciar@vt.edu. For detailed information about the position and Department, see http://www.geol.vt.edu.

In particular, we seek to augment our existing strengths in the integration and analysis of reservoir databases, and/or physics will be considered. This applied position focuses on the addition of a colleague studying terrestrial water chemistry, and a quantitative geomorphologist whose research emphasizes use of remote sensing data. Applicants at all levels will be considered; those received by December 10, 2000 are assured of receiving full attention. Please send a resume and names of four or more ref-erences to: Chair, Search Committee, Geology and Geo-physics Department, MS-126, Rice University, PO Box 1892, Houston, TX 77251-1892.

Additional information about the position and Department can be found at http://terra.rice.edu. Rice is an equal opportunity affir-mative action employer.

EARTH SYSTEMS SCIENCE FACULTY POSITION - RICE UNIVERSITY

DEPARTMENT OF GEOLOGY AND GEOPHYSICS

The Rice Geology and Geophysics Department is expanding in faculty, staff, and facilities. We are seeking to fill several tenure track positions in Earth System and Dynamics, the first of which will begin on July 1, 2001. We are interested in hiring an earthquake/global seismologist, a mineral physicist, and/or a high-temperature research scientist. Applications at all levels will be considered; those received by December 10, 2000 are assured of receiving full attention.

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GeoCorps America™: Geoscientists on America’s Public Lands

One earth science intern in one park interacts with hundreds of visitors. Those visitors are children, parents, students, voters, leaders, business people, consumers, and donors. The intern gets a great experience—maybe even a life- or career-changing experience. The visitors get something they can’t—or don’t—get from picking up a brochure. They get a personal encounter with a knowledgeable and enthusiastic human being. Other interns work on projects behind the scenes, helping to ease the strain from ever-tightening budgets and aiding the progress of important research.

Internships are popular. GSA gets hundreds of applications for only a handful of spots every year. Internships are needed. For example, the National Park Service has only about 40 geologists in almost 380 National Park areas nationwide, areas that people very often visit because of their geological interest.

That’s why GSA is launching GeoCorps America™, a consortium of supporting organizations and sponsors working together to gradually increase the presence of geoscientists on public lands.

Our Story So Far

GSA’s summer internship program with the National Park Service began in 1997 with two interns in two National Parks. In 2000, GSA placed interns in 13 National Parks. In addition, GSA and the U.S. Department of Agriculture Forest Service established Geology in the Forests, a program that pairs interns with practicing geologists. Interns work directly with the geologists in a combination of office and field assignments. GSA also has joined forces with the National Association for Black Geologists and Geophysicists to provide National Park internships for African-American students.

What GeoCorps Will Bring

GeoCorps America™ will expand this existing program, bringing new combinations of people and places together. It will protect GSA’s investment in internship programs to date, while enabling other organizations—associations, foundations, corporations, and governmental agencies—to benefit from a system that is already in place and working.

Win-Win Internships

Students benefit from the program in much the same way they always have. They can gain know-how in problem solving and communicating effectively with a wide variety of people. They can apply their skills—such as in writing, research, or database management—in real-life situations. And they can solidify their own career objectives.

Career professionals—including earth science teachers—can experience service sabbaticals on public lands, returning with renewed energy to their jobs and renewed enthusiasm for their science.

Experienced retired scientists can stay in the game, bringing their expertise to a new generation of students, visitors to public lands, and staff members.

Sponsoring companies or organizations can enjoy the benefit of positive public relations and a potential boost to their future work forces. In one GeoCorps model, a professional works with a student intern—what better way to get young scientists interested in a company or industry?

America’s public lands need help from scientists, particularly geoscientists. Millions visit our parks, forests, and monuments each year, and many are drawn by the geology of the areas. GeoCorps America™ can help by ensuring that more public lands have the scientific resources they need.

Jonathan Pennington
ow in its fourth year, GSA’s National Park Service (NPS) Internship Program has proven to be a successful partnership with the NPS Geologic Resources Division’s Geologist-In-The-Parks (GIP) Program. This collaboration and funding from the John F. Mann Fund, GSA Foundation Minority Fund, Doris Curtis Memorial Fund for Women in Science, and the National Association for Black Geologists and Geophysicists allowed for placement of 13 geoscience students in national parks and the desperately needed transfer of geoscience knowledge and expertise to park visitors and staff. In the words of the NPS interns, here is a summary of the summer of 2000.

On park geology

“Redwood trees and the spectacular vegetation and wildlife that surround them may not automatically bring to mind geology to park staff and visitors, but that was my job at Redwood National and State Park for the busy summer season. The beautiful and distinct trees, while one of the park’s biggest assets, also provide some of the biggest challenges to interpreting the local geology.” Kathryn Roberts, Redwood National and State Park

“Grand Canyon is a geologist’s playground. Nowhere else is arid-land erosion so dramatically displayed, or a rock sequence so clearly exposed. While its record extends back well into the Precambrian Era, the Paleozoic story tells of sea transgressions and regressions, Laramide uplift, and incision of the Colorado River. These resources also make Grand Canyon an interpreter’s ideal classroom.” Clifton Koontz, Grand Canyon National Park

On responsibilities

“My position was to observe and document the activities of the mining party in order to make sure the project was done according to the court orders agreed upon by the claim’s owner and the National Park Service. As a kind of check and balance system, both parties needed to be present while the claims sampling operation was taking place. My job consisted of detailed note taking, digital photography, videotaping, and assistance to the mining party. Explicit detail and documentation was necessary to aid the Park Service’s case against the claim’s owner.” Andrew Irvine, Denali National Park and Preserve

“The biggest portion of my time this summer was spent working in the visitor center, collecting fees, running the bookstore, and answering questions. My other duties included giving 15-minute geology presentations, collecting weather and acid rain data, roving, informal interpretation, and working on various projects.” Christine Wennen, Capulin Volcano National Monument

On projects

“I spent countless hours reading about the area’s history, geology, and any relevant research I could find that had been done in and around OZAR. After I felt more confident with my knowledge of the area, I completely revised the to-do list. The items OZAR needed were: organizing all of the data already collected on the caves, physically and digitally; updating the Ozark National Scenic Riverways Cave Database; updating the cave inventory and monitoring protocol and data forms; and collecting missing GPS coordinates and several other features for a number of the caves; all while generating reports for my supervisor and taking care of the needs of the rangers while they monitored.” Christina Jan, Ozark National Scenic Riverways

“I drove, hiked, boated, and kayaked to my outcrops, looked for fossils, and if I found any, would document them with notes, photographs, and a GPS reading. On my ‘recovery’ days I’d enter my data into the computer and supplement the manuscript with more information that I was getting from papers.” Brooke Swanson, Fossil Buttes National Monument

On accomplishments

“I am very proud of the independence I gained, both personal and professional, during this internship. I feel much more confident to enter graduate school next year, knowing that I can initiate a project and see it through to completion. I am also impressed with the amount of information I was able to learn about the Pacific Northwest after only having been there for three months. I was able to prove to myself that I can accomplish tasks with difficult people, and I sharpened my people skills by calming irritated visitors who had to wait two hours for a cave tour.” Stephanie Larsen, Oregon Caves National Monument

“Over the summer, I was able to see how Assateague’s geology is the reason for the incredible dynamism of all the island’s natural systems, be they terrestrial plant communities, marine animals, migratory birds, or what have you. I then was able to...”

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In the Words of GSA’s National Park Service Interns
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Amanda Kolker, Assateague Island National Seashore

On lessons learned

“This internship has taught me so many more things than I expected. Besides improving my ability to present programs to large, diverse groups, I now feel as if it is second nature to stand in front of people and speak. I know that this will be a tool that I will be able to take with me for the rest of my life. Leading Junior Ranger programs has also sparked a new interest in children for me. Because of my positive experiences, I am considering going into a field of education. I have also learned about the way National Park Service functions, where funding comes from, and countless minor yet irreplaceable duties that a ranger is responsible for. Above all, it has taught me a new respect for diversity of people and learning how to improve myself by interacting with new and different people. I am endlessly thankful for being provided with this opportunity; I have learned so much I will be able to have the best summer of my life.”

Audrey Sherry, Florissant Fossil Beds National Monument

“This experience exposed me to the challenge of presenting geologic topics in a form that all ages can understand. It has also encouraged me to seriously think about pursuing a field of scientific teaching. I enjoyed the experience for the things it exposed me to and the fun it was to think up activities to explain geologic processes.”

Brien Park, Bryce Canyon National Park

On advice for future interns

“I thoroughly enjoyed the opportunity to exercise my education by doing geology work in Denali, but I loved my summer because I loved where I was. Future interns need to understand that work in Denali means long days, harsh weather and more mosquitoes than one can imagine. Wilderness remains wilderness because it is relatively inhospitable. I happen to enjoy roughing it, which proved to be a great asset over the summer.”

Andrew Irvine, Denali National Park and Preserve

“My advice to future interns is to be open-minded and willing to roll with whatever an internship such as this offers you. Even though it might not meet your expectations, reap as much knowledge as you possibly can and make the absolute best out of what the situation offers you. Learn from and in turn educate as many employees and visitors as you can. The self-fulfillment will stay with you for the rest of your life. Don’t miss an opportunity to meet new people because they could be the greatest things that will ever happen to you.”

Christina Jan, Ozark National Scenic Riverways

“I have lots of advice for future interns. Some things you should know: This is a very physical job. I spent hours shoveling gravel and transplanting trees. The hike to the Star Dune was exhausting, especially carrying GPS and surveying equipment. That was a 13-hour day. This is not a place for people who don’t like to get sweaty and dirty. Also, be prepared to deal with kids. They love rangers and will ask you a ton of questions. You will be working with the public a great deal. You will be working a cash register and answering the telephone. This is not a job for unsociable people. Also, at this elevation the Sun’s radiation is very intense. I was sunburned very badly after only two hours over the 4th of July holiday. Always wear sunscreen.”

Michael Canedy, Great Sand Dunes National Monument

On contacts

“Every day, hundreds of people visited Dry Falls to do one thing, marvel at the geologic phenomena. They are rarely locals, do not drive there to drink or picnic, or to drive boats or jet skis—they drive there to see geology. This meant that when I walked around and told the visitors that I was the park geological interpreter and that I would be happy to answer any questions they had, I didn’t get ignored—I got accosted! In fact, I drew a crowd. It was wonderful!”

Jonathan Pennington, Lake Roosevelt National Recreation Area

“I contacted every employee and really helped the interpretive staff with geology. Also, many of the summer seasonal staff and Student Conservation Association people came to me with any geology questions that they had.”

Michel Canedy, Great Sand Dunes National Monument

For information on 2001 internship opportunities, contact Katie Keller Lynn, (303) 447-2020, ext. 194, kkellerlynn@geosociety.org. Applications are due February 1, 2001.

Bulletin and Geology Highlights

In December Bulletin

Focus on geomorphology and surface processes

In December Geology

A depression afar
Tectonic speciation
The impact of submarine slides
Barometry barred

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For details, contact us at member@geosociety.org, 1-888-443-4472, or (303) 447-2020, ext. 774.
Send statements of research and teaching interests, curricular vita, and three references to: James N. Galloway, Professor and Chair, University of Virginia, Department of Environmental Sciences, P.O. Box 40010, Charlottesville, VA 22904-4323.

Evaluation of applications will begin on 15 November 2000. All applications must be received by 01 January 2001. In addition to the printed application, we would appreciate a contribution to our on-line catalog at http://home.earthlink.net/~msbooks for books on Geology, Mining History, Ore Deposits, USGS, and related services & supplies. An on-line catalog is available at http://home.earthlink.net/~msbooks. Find our Services & Supplies

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The Department of Geology at Kent State University seeks to hire a surface-water hydrologist at the tenure-track Assistant Professor level beginning fall semester, 2001. The successful candidate should possess the Ph.D., have a strong background in the geological sciences, and be able to interface well with other faculty working in a variety of water-related specialties. Specific research interests are open and may include any of the broad range of water-related studies, such as the chemistry of water-sediment interactions; trace-element or major-element geochemistry; organic geochemistry; geomicrobiology; environmental geochemistry; and computer applications in geology. Responsibilities will include teaching advanced undergraduate and graduate courses in hydrology; advising instruction of the introductory geological course: Geology 101, and Ph.D. candidates; and developing a strong, funded research program. The initial course load will be two courses per year, giving the successful candidate time to seek external funding and pursue research.

Low-Temperature Aqueous Geochemistry: The Department of Geology at Kent State University seeks to hire a low-temperature aqueous geochemist at the tenure-track Assistant Professor level beginning Fall Semester, 2001. The successful candidate should possess the Ph.D., have a strong background in the geological sciences, and be able to interface well with other faculty working in a variety of water-related specialties. Specific research interests are open and may include any of the broad range of water-related studies, such as the chemistry of water-sediment interactions; trace-element or major-element geochemistry; organic geochemistry; geomicrobiology; environmental geochemistry; and computer applications in geology. Responsibilities will include teaching advanced undergraduate and graduate courses in hydrology; advising Ph.D. and M.S. candidates; developing a strong, funded research program, and assisting with instruction of one of the introductory geological courses including Environmental Geology, Physical Geology, or Oceanography. The initial course load will be two courses per year giving the successful candidate time to seek external funding and pursue research.

Sedimentary Geologist: The Department of Geology at Kent State University seeks to hire a sedimentary geologist at the tenure-track Assistant Professor level beginning Fall Semester, 2001. The successful candidate should possess the Ph.D., have a strong background in the geological sciences, and be able to interface well with other faculty working in a variety of paleontologic, tectonic, and sedimentary specialties. Specific research interests are open and may include such areas as carbonate sedimentology, tectonic evolution of sedimentary basins, sequence stratigraphy, or biostratigraphy. We seek a scientist with experience and interest in pursuing laboratory and field-based problems. Responsibilities will include teaching our basic level course in stratigraphy; assisting with instruction of one of the introductory geological courses, including Environmental Geology, Physical Geology, and Oceanography. The initial course load will be two courses per year giving the successful candidate time to seek external funding and pursue research.

The department presently has 10 full-time faculty members, 80 undergraduates and 35 graduate students. Faculty are presently active in tectonic geology, sedimentology, paleontology, micropaleontology, paleoecology, limnology, wetlands and surface water-groundwater interactions, hydrogeology, climate change, landscape evolution, and geomorphology, slope stability, and engineering geology. The department maintains 22 research laboratories and is well-equipped for both applied and basic geological research. There are excellent opportunities for cooperative research and teaching within the Department of Geology, the Ohio Geological Survey, the National Center for Atmospheric Research, Sandia National Laboratories, the National Institute of Water and Atmospheric Research, the United States Geological Survey, and the Department of Geological and Environmental Sciences, New Mexico Tech, Socorro NM 87801, www.ess.nmt.edu/Hydro/homepage.html.

Grinnell Fellowships, University of Kansas. The Grinnell Fellowship is a one-year fellowship of up to $20,000 for a qualified Ph.D. student. Subsequent support for three years beyond the fellowship will be awarded toward the degree is made. There are three fellowships to be awarded for the next academic year. Details of research opportunities and facilities at Grinnell can be found on the World Wide Web at http://www.geo.ukans.edu. You can contact Dr. Douglas Walker, jdwalker@ku.edu, Dept. of Geology, 1474 Jayhawk Blvd., Room 120, Lawrence, Kansas 66045-7748. (785-864-9475) or Dr. Stockli, 626-395-6177; stockli@gps.caltech.edu, for further information.

Thermochronology and Tectonics. The fellowship recipient will be expected to conduct research in the new (U-Th)/He thermochronology laboratory. Potential research projects include the application of low-temperature thermochronology to tectonic and geologic problems at subduction zones, collision margins, and continental margins. Other potential research topics include the application of low-temperature thermochronology to tectonic and geologic problems at subduction zones, collision margins, and continental margins. Further information can be obtained at the University of Alabama. Contact Dr. Daniel Stock, 826-395-6177; stockli@gps.caltech.edu, for further information.

Organic Geochemistry. The student selected to receive this fellowship will be expected to do research in the new environmental organic geochemistry laboratory at UVa (www.terra.rice.edu). Students interested in studying organic reactions with aquifer materials and other reactive solids used in groundwater remediation are encouraged to apply. For further information, Dr. J.F. (Rick) Devlin, Dept. of Geology, 1474 Jayhawk Blvd, Room 120, Lawrence, Kansas 66045-7613, 785-864-4971 or check http://www.terra.rice.edu for a description for further information.

We encourage applications from students seeking M.S. or Ph.D. degrees who are interested in the following areas: global ecology, remote sensing, microbial ecology, paleoecology, and molecular biology. Areas of departmental expertise include hydrology, remote sensing, environmental geochemistry and geochemistry, carbonate and clastic sedimentology, paleontology, porosity, and geology and computer applications in geology. Field research is carried out in Scotland, the Sierra Nevada in California, and Africa, as well as Texas and Oklahoma. Contact Dr. R. Hanson at 817-257-7996; hanson@gamma.is.tcu.edu. Additional information about the department can be found on our Web site at http://geowww.geo.tcu.edu.

Graduate Assistantships: Mesoproterozoic Plate Reconstructions and Tectonics of Southern Africa. The Geol- ogy Department at Pennsylvania State University is seeking a graduate student to participate in research on the geology and Tectonics of Southern Africa. The geology and tectonics of the region are of increasing interest as a result of the current NSF Science & Technology Center for Remote Sensing and Energy Research. Assis- tantsships available for M.S. students. Interested students should contact Dr. Richard Walker, 2217 Earth Engineering Science Bdg., University Park, PA 16802 (spangler@essc.psu.edu) or check http://www.essc.psu.edu/BR/for further information. The Penn- sylvania State University is an equal opportunity/affirmative action employer. Women and minorities are encouraged to apply.

Research Assistantships/Hydrology/N.M. Tech. Graduate research assistantships are available for students interested in working on projects related to a NSF Science & Technol- ogy Center on Sustainability of SemiArid Hydrology and Riparian Ecosystems (http://geowww.geo.tcu.edu). New Mexico Tech is a lead participant. This center was formed to address the growing problems of increasing water scarcity in semi-arid regions of the southwestern United States. The objective of the Center is not only to obtain new scientific insights into the hydrological system, but also to develop and present the scientific results in such a way that they can actually be applied to the resolution of water resource problems in the near future.

We encourage applications from students seeking M.S. or Ph.D. degrees who are interested in the following research topics: Basin-scale water and salinity balance, influence of climate variability on water resources, Vadose zone and soil processes, characteristics of organic compounds, and the geochemistry of anoxic environments. Interested students at all levels should write to L. Spang- ler, 2217 Earth Engineering Science Bdg., University Park, PA 16802 (spangler@essc.psu.edu) or check http://www.essc.psu.edu/BR/ for information. The Penn- sylvania State University is an equal opportunity/affirmative action employer. Women and minorities are encouraged to apply.

Nasa planetary biologist internships. The marine Biological Labo- ratory, Woods Hole, Massachusetts, invites applications from graduate students and seniors accepted to graduate programs for awards of $2200 plus travel to par- ticipate in research at NASA centers and collaborating insti- tutes for approximately 8 weeks. Typical intern programs include: organic geochemistry, marine paleoecology, ancient biomineralization, and origin and early evolution of life. Application deadline: March 1, 2001. For information/applica- tions, contact: Michael Wass, Michigan State University Intern- ships, Department of Geosciences, Box 3-5820, University of Massachusetts, Amherst, MA 01003-5820. E-mail: mineralization@msu.edu, phone: 810-442-3223. An Equal Opportunity/Affirmative Action Employer.
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