EOS

EOS, TRANSACTIONS, AMERICAN GEOPHYSICAL UNION

VOLUME 88 NUMBER 31 31 JULY 2007

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Meshing American Indian Concerns with Goals of EarthScope's USArray

American Indian nations comprise a significant portion of the lands in the western United States, so as researchers deploy the USArray seismographic component of EarthScope across the Southwest and progress into the Rocky Mountains and Great Plains, they have crossed into Indian country (Figure 1). Informed relations among researchers and tribal officials are prerequisite to the timely permitting and deployment of scientific instruments.

Conducting Research on Sacred Land

American Indian nations are not monolithic in their response to outsiders seeking access to their lands for scientific research, but certain factors can be expected to apply in all cases. First, homelands are considered to be sacred. Sacredness of land, frequently cited although not often defined simply, implies a kinship among people, landforms, biota, and natural phenomena, manifested as a complex system of beliefs linked directly to places [*Kelley and Francis,* 1994].

In particular, geoscientific research in these places may be regarded by many American Indians as inappropriate, disrespectful, or even sacrilegious—much as anyone might feel about intrusive medical or psychological research conducted on a loved one. An ongoing federal court battle over the use of reclaimed wastewater for snowmaking on the San Francisco Peaks near Flagstaff, Ariz., an extinct stratovolcano sacred to a number of tribes but outside of any official tribal jurisdiction, demonstrates that American Indian people will defend lands they hold sacred on the basis of religious freedom.

As a consequence, tribal land-use regulations are culturally defined. Establishing scientific instruments on a tract of land may require clearances not only for environmental and wildlife impact, but also for preservation of archaeological and ethnographic resources. While such requirements also apply to federal lands, detailed knowledge of potential sites on American Indian homelands may be deemed culturally sensitive and unavailable to outsiders. In this case, researchers may only be able to request a station site somewhere within a general area, subject to confidential review and selection by elders or other traditional cultural experts.

Geoscientists and indigenous people may have very different philosophical positions on unfettered scientific inquiry [*Cajete,* 2000] and global access to local data, so it should not be assumed that purely academic-type research, such as that exemplified by EarthScope, will be immediately welcomed. Instead, American Indian landholders, not unlike many non-Indians, may be skeptical about the purpose of the research, and they may suspect hidden economic motives. History justifies their wariness: Well-remembered episodes such as the Cold War pursuit of uranium on the Colorado Plateau, a recent form of geophysical exploration on American Indian homelands, led to resource exploitation with lasting damage to environmental quality and public health [e.g., *Eichstaedt,* 1994].

Building a Partnership in Arizona

In concert with EarthScope-related research, the EarthScope education and outreach (E&O) implementation plan [*EarthScope Education and Outreach Steering Committee*, 2007] calls for partnerships with American Indians that will impart in them a sense of ownership in the project and calls for using the EarthScope facility and data to enhance interest and learning among a minority student population that has been chronically underrepresented in geoscience studies and careers [*Riggs and Semken, 2001*; U.S. National Science Foundation, unpublished data, 2006].

In Arizona, one of the first eight states to host EarthScope instrumentation, plans called for the deployment of USArray Transportable Array (TA) stations on or near the lands of as many as seven different American Indian nations. No protocols for working with these nations had been established, although useful experience accrued from the Colorado Plateau–Río Grande Rift Seismic Transect (La RISTRA) experiment on the Navajo nation [*Wilson et al.,* 2005]. EarthScope's success depends on the USArray staying on schedule and on healthy relationships with the communities it passes through. Toward this end, we have collaborated with decision-makers in American Indian communities in Arizona for the past 18 months to facilitate USArray station siting and E&O activities in a culturally appropriate manner. As the USArray progresses eastward, EarthScope scheduling—and hence research activities—will significantly benefit from similarly productive interactions with American Indian stakeholders in the Rocky Mountains and Great Plains.

Opportunities for Education and Outreach

Isolation and poverty limit educational opportunities for American Indian students in science and mathematics. EarthScope has the potential to bring cutting-edge geoscience research literally to their backyards. It is incumbent upon researchers to develop effective E&O partnerships with schools and citizen groups in tandem with siting and deployment, and these relationships must remain viable even after the instruments have been removed. Researchers should also be aware that lack of access to up-to-date instructional technologies and the Internet—the so-called "digital divide"—may remain a problem in some reservation schools and community centers. E&O projects should be designed to provide or help provide equipment and resources where they are needed.

Many American Indians are concerned about the environmental and cultural sustainability of their ways of life in small traditional communities on finite land bases. Toward this objective, indigenous educators advocate "place-based" teaching [*Cajete,* 2000], which emphasizes active inquiry by students in the local environment, the synthesis of traditional and scientific knowledge of places, and service projects to benefit communities [*Semken,* 2005]. Earth science is an important component of an authentically place-based curriculum, but the opportunity to actively investigate local geologic structure and history typically ends at the land surface. EarthScope researchers and educators can address this, in the short term by involving American Indian teachers and students in instrument deployment and data analysis, and in the long term by working with local curriculum developers to integrate findings about regional structure, dynamics, and evolution into place-based science curricula.

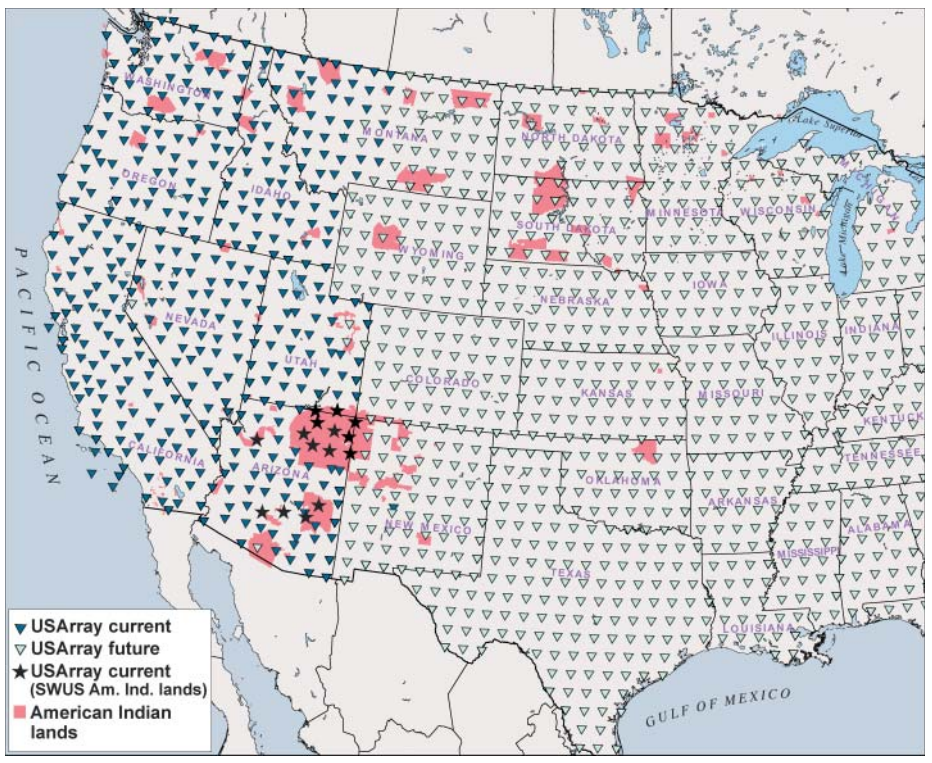

Fig. 1. Current (solid triangles and stars) and future (grey triangles) USArray Transportable Array deployments in the western contiguous United States, including American Indian lands (in salmon). Transportable Array stations sited on American Indian lands in the southwestern United States are denoted by stars.

Perspectives and Preferences

Our direct collaboration with Arizona tribes began with a 2-day workshop, "Native American Perspectives and Preferences Bearing on EarthScope Deployments in the Southwest (NAPP-ES)," held at Arizona State University (ASU) in November 2005 and funded by the EarthScope Science program of the U.S. National Science Foundation (NSF). Workshop participants represented a broad cross section of stakeholders: the Gila River, Hopi, Hualapai, and Navajo nations; tribal schools; the national E&O programs of EarthScope, Incorporated Research Institutions for Seismology (IRIS), and University NAVSTAR Consortium (UNAVCO); siting specialists from IRIS PASSCAL (Program for Array Seismic Studies of the Continental Lithosphere); and ASU researchers and American Indian liaisons. The NAPP-ES workshop embodied a successful intercultural exchange: EarthScope researchers provided tribal decision-makers with an introduction to the scientific and E&O components of the project, while the American Indian participants shared valuable information about relevant cultural and jurisdictional issues.

The principal findings from this workshop are summarized here and offered as recommendations for subsequent siting and E&O activities:

1. Contact tribal decision-makers well in advance of instrument deployment activities. An informal, brief, expenses-paid workshop like NAPP-ES is an appropriate and effective way to introduce a critical mass of tribal officials and educators to the EarthScope program and ask for their collaboration. Goodwill earned here could be indispensable when reconnaissance and permitting activities begin.

2. Recognize that each tribal government has unique policies and protocols and that jurisdiction over land access and use may be community-based or centralized. Ask workshop participants for guidance.

3. Be aware that a suite of ethnographic, archaeological, environmental, and biological clearances may be necessary to obtain siting permits, and be prepared for unanticipated requirements (e.g., permits for the use of telemetry to relay USArray data).

4. Note that some proposed sites, although they are outside of legally designated reservations, may be located on lands recognized as ancestral or sacred by one or more American Indian nations. The status of these lands can be determined with assistance from tribal historic preservation offices.

5. Obtain permission to visit landholders and communities near each proposed station site to promote E&O partnerships. Begin all community encounters with a clear and adequate explanation of the methods and benefits of the research.

6. As USArray station construction involves digging into the Earth, it may be necessary to consult traditional healers or other cultural practitioners in the local community for their approval.

7. Volunteer to return to communities and schools to promote EarthScope and to distribute educational materials during public gatherings such as fairs, powwows, and rodeos.

8. Provide commemorative materials for schools and community centers, such as plaques, photos, and displays.

9. Help schools and community centers to enhance their technological capabilities.

10. Collaborate with indigenous educators to develop bilingual and culturally sensitive E&O materials, and encourage the use and expansion of Native scientific knowledge, terms, and pedagogy. Note that many American Indian languages are predominantly oral, so audiovisual recordings are most appropriate for Elders.

11. Make place-specific E&O materials; be sure those aimed at youth are child-friendly, presented from a student's or teacher's point of view.

12. Hold meetings and workshops in communities after USArray has passed through; keep stakeholders in the loop when research findings are presented.

The critical outcome of the NAPP-ES workshop was the opportunity to establish direct connections with most of the American Indian nations in the Arizona TA footprint. Many of the Native participants continued to provide advice and assistance to the researchers and to USArray personnel as site reconnaissance and permitting activities began. During the year following the work-

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By S. Semken, M. Fouch, E. Garnero, P. Zah, and D. Lippert

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shop, the NAPP-ES principal investigators met separately with officials and educators at tribal offices and schools. These connections facilitated the siting and permitting of TA stations across Arizona in 2006 and early 2007 (see Figure 1).

Station Siting and Permitting

Permitting TA stations on wholly undisturbed American Indian lands in Arizona proved too laborious for timely deployment, due to a host of obligatory archaeological, ethnographic, environmental, and biological clearances. On the advice of, and frequently with direct assistance from, the NAPP-ES tribal partners, permits instead were secured for "disturbed" sites on developed land, which had already received most of the necessary clearances. This was an approach similar to that used for many TA sites on federal lands. While these sites likely possess somewhat more seismic noise on average than more pristine places, the trade-off was necessary to ensure permitting in a timely (i.e., less than 1 year) manner. Wherever possible, we sought to place TA stations on or near school grounds, for the obvious E&O opportunities. An American Indian cultural resources consultant was retained to research the status of clearances on each site and to prepare permit applications.

Most TA stations on American Indian land were sited on one of three types of "disturbed" sites: rural homesites; the grounds of a tribal college or K-12 school; and secured uranium-mill tailings repositories, which are located near former mining communities and now are jointly managed in perpetuity by the U.S. Department of Energy and the Navajo nation. At the latter sites, the instrument is buried in an uncontaminated buffer zone between a boundary fence and a fully encapsulated tailings pile.

Education and Outreach Partnerships

Concurrently with the siting and permitting activities, we have established E&O partnerships with K-12 schools on or near the Navajo, Hopi, San Carlos Apache, White Mountain Apache, and Gila River Pima-Maricopa nations; and we have reinvigorated EarthScope's affiliation with Diné College, the tribal college of the Navajo nation. Recent or anticipated outcomes for each of the schools include enrollment in the IRIS Seismographs in Schools program (with schools receiving an AS-1 seismograph); scheduled visits from EarthScope researchers; facilitated access to educational materials from EarthScope, IRIS, UNAVCO, and other research consortia; collaboration between EarthScope researchers and schools in the development of bilingual and cross-cultural curriculum materials; and participation in the EarthScope community. As an example of the latter outcome, a geoscience instructor from Diné College and two science teachers from San Carlos High School participated in the 2007 EarthScope National Meeting in California.

Acknowledgments

The NAPP-ES workshop and follow-up meetings were supported by award EAR-0454502 from the NSF's EarthScope Science Program. Siting-related outreach work was supported by a grant from the USArray Siting Outreach Program. All opinions, findings, conclusions, and recommendations presented in this article are those of the authors and do not necessarily reflect the views of NSF or EarthScope. We gratefully acknowledge assistance and permission from the Gila River Indian Community Office of Land Use Planning, Gila River Indian Community Education and Natural Resources Committees, Gila River Indian Community District 6, Hopi Tribe Department of Natural Resources, Navajo Nation Historic Preservation Department, Navajo Nation Minerals Department, Navajo Nation Uranium Mill Tailings Remedial Action (UMTRA) Department, Navajo Nation Education and Natural Resources Committees, U.S. Array Operations, U.S. Department of Energy UMTRA Program, U.S. Bureau of Land Management, Diné College, Canyon Day Junior High School, Gila Crossing Community School, Peralta Trails Elementary School, Rough Rock High School, San Carlos High School, and Shonto Prep High School. We are indebted to D. Bahee, N. Bueno Watts, B. Busby, R. Bush, P. Charley, T. Dawes, J. DeLaughter, D. Elvrum, S. Eriksson, R. Evans, P. Hickey, G. Haro, S. Helbock, R. Hunter, B. Klein, L. LaPrise, R. Maldonado, M. Martin, R. Martin, M. Mayer, B. Mayfield, S. Nair, P. Nakai, D. PaQuin, J. Parrish, D. Pastor, D. Skeets, K. Stevens, J. Taber, A. Taylor, J. Tschopp, G. Vincent, and the late G. Patton.

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EOS

TRANSACTIONS
AMERICAN GEOPHYSICAL UNION
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Eos, Transactions, American Geophysical Union (ISSN 0096-3941) is published weekly by the American Geophysical Union, 2000 Florida Ave., NW, Washington, DC 20009 USA. Periodical Class postage paid at Washington, D.C., and at additional mailing offices. POSTMASTER: Send address changes to Member Service Center, 2000 Florida Ave., NW, Washington, DC 20009 USA. *Member Service Center* 8:00 a.m.–7:00 p.m. Eastern time; Tel: +1-202-462-6900; Fax: +1-202-328-0566; Tel. orders in U.S.: 1-800-966-2481; E-mail: service@agu.org. Information on institutional subscriptions is available from the Member Service Center.

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Ancient Sundials and Maps Reveal Historical Geomagnetic Declination Values

Long records of the evolution of Earth's magnetic field help in the understanding of the field's generating mechanism. Archeomagnetism and palaeomagnetism supply valuable low-resolution information about the field over time ranges of centuries to millions of years. Higher spatial resolution can come from direct measurements of the field, but these are restricted to the past few hundred years.

In some places, such as London, Rome, or Paris, declination and inclination were frequently measured over the past four centuries [*Malin and Barracogh*, 1981; *Cafarella et al.*, 1992; *Alexandrescu et al.*, 1996]. In the early nineteenth century, measurements of field intensity became available, and the first magnetic observatory recording three field components (declination, inclination, and horizontal intensity) was installed by C. F. Gauss, in Göttingen, Germany, in 1832. Since then, continuous observations of the vector magnetic field have been made by some 200 worldwide observatories, thus making it possible to obtain good, though still incomplete, knowledge of the detailed field morphology and temporal evolution.

Recently, large efforts have been made to improve the existing database of historical observations with navigation measurements [*Jackson et al.*, 2000] or with observations in certain locations, where data might exist over centuries. Wishing to increase the number of long-term series from land locations, we have recently focused on historical German observations. As part of these efforts, we discovered two new sources of magnetic data: sundials and old maps.

Ancient sundials often contain declination information, which is needed for accurate orientation of the sundial by magnetic compass. One of the oldest values for the German territory comes from Nuremberg in 1465, with a declination estimation of +6° [*Zinner*, 1979]. The oldest sundial in the Niemegk observatory collection (Figure 1), also made in Nuremberg (1601), gives a declination of +6° [*Körber*, 1962]. The value computed for the same location from the global spherical harmonic GUFM model, which is based on historical and modern data from 1590 to 1990 [*Jackson et al.*, 2000], is +8.9°.

Historical maps sometimes also have an indication about declination. Figure 2 shows one example for Munich [*Bachmann*, 1942]. Only a part is reproduced from the original map (32 × 47 centimeters), in which the place (Monachivm, Bavaria), the year (1613), and the compass are shown. The declination in Munich at this epoch can be estimated at +8° to +9°, with an uncertainty around ±1°, based on the reading of the angle between the true and magnetic north directions indicated on the printed compass. This value is slightly larger than the value of +6° given by the GUFM model for the same location and epoch.

The difference between the historical data and GUFM estimations in both cases is around ±2°. This is a good agreement, considering the errors in readings and that the

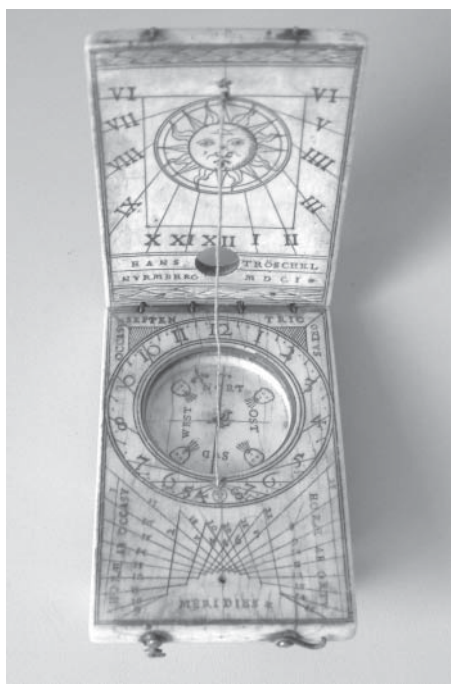

Fig. 1. Sundial with compass made in Nuremberg in 1601 (Niemegk Observatory collection).

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Values

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GUFM model gives weighted misfit between the used data and model around 1.3°, for that time. However, it also hints at possible further refinements of historical models by additional data, for which reason we are currently compiling a new long series of declination for Bavaria. Such attempts and the interesting scientific results from already published long magnetic series are encouraging examples for a continuation of the rescue of historical magnetic measurements.

Acknowledgments

We thank Hannelore Podewski for compiling historical declination data from different sources and Klaus Eichholz for complementary information on sundials.

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Fig. 2. Left side of a Munich map from 1613 (made by Tobias Volkmer) with a compass indicating declination. From Bachmann *[1942]. Reprinted with permission from Anton Hiersemann KG, Verlag Stuttgart.*

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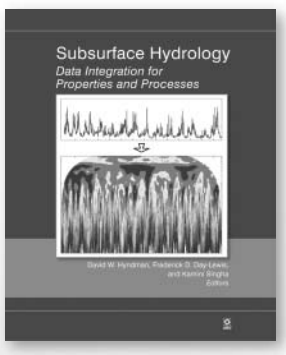

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NEWS

Southern Ocean Mapping Program Restarts

The International Bathymetric Chart of the Southern Ocean (IBCSO) mapping program restarted at the end of 2006 after a 2-year break. The program is based at the Alfred Wegener Institute for Polar and Marine Research, in Bremerhaven, Germany.

Since the program restarted, some important topics have been revised and updated: New bathymetric data are being collected by various cruises with R/V *Polarstern*; new expeditions are being planned and have been carried out to Antarctic waters; a mailing list for improved communication is being established at the National Geophysical Data Center; the IBCSO expert group is being revitalized; and the conceptual design and implementation of the program's geodatabase and metadata structure conceptual design and implementation are under way.

Future work will comprise continuous data transfer to the data management system; updating the heterogeneous data sets; evaluating digital data processing techniques for optimized data merge; improved visualization of the IBSCO; and promotion of the IBCSO to the Antarctic Earth sciences, ocean mapping, and data infrastructure communities.

A key objective is to collect and compile heterogeneous bathymetric data sets with additional seamless data derived from radar satellite images, satellite altimetry, and gravity that presently reside in numerous national and international databases and repositories. These data sets are maintained by a number of research institutes, universities, agencies, and related data centers in many countries.

Echo sounding data are heterogeneous in terms of age, acquisition systems, accuracy, preprocessing, and documentation. The large variety of data types and data formats necessitates the use of geographic information systems (GIS) for data collection, storage, manipulation, and visualization. Consistent integration of the diverse data sets is assured in a GIS environment with extensive data import and export capabilities. Digital data processing throughout the work will facilitate the production of cartographic printed maps (printed on demand) and digital Web maps.

The implementation of a southern equivalent to the International Bathymetric Chart of the Arctic Ocean was proposed and accepted by an ad hoc working group meeting during a General Bathymetric Chart of the Oceans meeting in 2002. The resulting ocean mapping program for the compilation of the IBCSO was adopted as an International Bathymetric Chart mapping project by the 37th Executive Council of the Intergovernmental Oceanographic Commission in 2004. The IBCSO is now well established within international and intergovernmental organizations (e.g., the Scientific Committee on Antarctic Research (SCAR), the International Hydrographic Organization, and the Intergovernmental Oceanographic Commission (IOC) of the United Nations Educational, Scientific and Cultural Organization).

IBCSO was set up in an official framework by the SCAR Geosciences Standing Scientific Group, the IOC Consultative Group on Ocean Mapping, and the Hydrographic Committee on Antarctica. In addition, the IBCSO group has liaisons with the SCAR Scientific Committee on Oceanic Research Expert Group on Oceanography and the SCAR Standing Committee on Antarctic Geographic Information.

The IBCSO expert group will hold a business meeting on 1 September 2007, from 8:00 A.M. to noon, during the 10th International Symposium on Antarctic Earth Sciences at the University of California, Santa Barbara. Scientists with substantial interest in Southern Ocean bathymetry or GIS-based data infrastructure are invited to subscribe and participate in the meeting. For more information. see the Web site http://www.ibcso.org.

—NORBERT OTT and HANS WERNER SCHENKE, Alfred Wegener Institute for Polar and Marine Research, Bremerhaven, Germany; E-mail: Norbert.Ott@awi.de

Database Gathers Oceanographic History

Project OceanograFacts, developed by NortekUSA, seeks input for its database of significant oceanographic events. This database aims to assemble at least 365 significant oceanographic events, one for each day of the year. Each event must be documented to be linked to a specific date.

Examples of significant events include

- 22 April 1513, when Ponce de Leon first described the Gulf Stream in his logbook;
- 22 September 1893, when the Arctic R/V *Fram* got trapped in ice; and
- 1 October 1948, when Ocean Weather Station Mike began deep-ocean measurements.

Each full listing would include a paragraph describing the event and a multiple-choice question based on the information. Through this compilation, NortekUSA hopes to inspire appreciation of oceanography and its heritage. For more information and guidelines on contributing to the database, visit the NortekUSA Web site at http://www.nortekusa.com or send an e-mail to facts@nortekusa.com.

—ERIC SIEGEL, NortekUSA, Annapolis, Md.; E-mail: eric@nortekusa.com

In Brief

Deep Underground Lab Design Team Picked The U.S. National Science Foundation (NSF) announced on 10 July 2007 the selection of a University of California-Berkeley proposal to produce a technical design for a U.S. Deep Underground Science and Engineering Laboratory (DUSEL) at the former Homestake gold mine near Lead, S.D. NSF also will begin working with researchers to identify initial experiments that might be deployed in DUSEL, according to Tony Chan, assistant director for NSF's Directorate of Mathematical and Physical Sciences.

NSF concurred with a panel of external experts who had determined that the proposal offered the greatest potential for developing a DUSEL. Any decision to construct and operate this laboratory needs further approvals by NSF and the U.S. National Science Board. An interdisciplinary "deep science" laboratory could shield sensitive physics experiments from background activity and could provide scientists with direct access to geological structures, tectonic processes, and life forms that are best studied deep underground. A Homestake DUSEL, if built as envisioned by its supporters, would be the largest and deepest facility of its kind in the world.

Southern Africa Moisture Map The European Space Agency (ESA) announced on 16 July 2007 the availability of new soil moisture maps for southern Africa that could lead to better forecasting of weather and extreme events such as floods and droughts. The maps, based on data from ESA's Envisat satellite, have a spatial resolution of one kilometer. Soil moisture plays an important role in the global water cycle: with too little moisture, rain-fed crops and vegetation can wilt; too much moisture increases the risk of flooding, flash floods, and erosion.

"This [mapping] brings hydrology into the 21st century and makes life better for people," said Geoff Pegram of the University of KwaZulu-Natal, South Africa. Pegram served as the African technical partner and liaison to African user groups for the ESA-backed SHARE (Soil Moisture for Hydrometeorological Applications in the Southern African Development Community Region) project, which is demonstrating that spaceborne Synthetic Aperture Radar instruments can deliver soil moisture data at high spatial and temporal resolution. For more information, visit the Web site: http://www.ukzn.ac.za/sahg/share/.

Rita Colwell Receives National Medal of Science Rita Colwell, director of the U.S. National Science Foundation from 1998 to 2004, was awarded a U.S. National Medal of Science in a White House ceremony on 27 July 2007. Colwell, currently a professor of microbiology and biotechnology at the University of Maryland at College Park and a professor at Johns Hopkins University Bloomberg School of Public Health, received the award for her research on global infectious diseases and marine microbes, specifically the bacterium that causes pandemic cholera. The National Medal of Science is the United States' highest honor for scientific achievement. Colwell currently serves on AGU's development board.

—RANDY SHOWSTACK AND MOHI KUMAR, Staff Writers

MEETING ANNOUNCEMENTS

■ 11–14 September 2007 **High Latitude Terrestrial and Freshwater Ecosystems: Interactions and Response to Environmental Change**, Abisko, Sweden. Sponsors: Climate Impacts Research Centre; ENVISNAR; Lake Ecosystem Response to Environmental Changes. (Conference Secretariat; E-mail: emg-workshopabisko2007@lists.umu.se; Web site: http://www.emg.umu.se/circ/workshop/)

This workshop will bring together leading researchers in the fields of high latitude ecology and biogeochemistry. The primary aims of this workshop are to link research on terrestrial and aquatic ecosystems in a catchments-scale perspective and to assess the impact of climate change on these ecosystems. Topics include functionality of terrestrial ecosystems, productivity and function of aquatic ecosystems, and environmental change and related effects in high latitude ecosystems.

■ 30 September–3 October 2007 **34th Aquatic Toxicity Workshop**, Halifax, Nova Scotia, Canada. Sponsors: Fisheries and Oceans Canada; Minnow; Environment Canada; others. (L. Burridge, Fisheries and Oceans Canada,, St. Andrews. NB, U.S.A.; Tel.: +1-506-529-5903; E-mail: BurridgeL@mar.dfo-mpo.gc.ca; Web site: http://www.atw.ca/default.asp)

Scientists and managers from academia, government, and environmental consulting organizations will explore the latest findings in freshwater, marine, and estuarine toxicology research. With the theme "Navigating New Waters," session topics include agricultural stressors, endocrine disruption, sediment/soil toxicology and toxicity testing, and stable isotopes in ecotoxicology.

■ 14–17 October 2007 **The Crustacean Society Mid-Year Meeting**, La Serena, Coquimbo, Chile. Sponsors: The Crustacean Society; Universidad Católica del Norte. (Conference Secretariat; E-mail: tcschile2007@ucn.cl; Web site: http://www.bedim.cl/tcs2007)

During this conference on crustacean science, open session topics include general biology, ecology, behavior, physiology, systematics, pathology, aquaculture, and fisheries. Participants are invited to bring video clips of crustaceans for a video night presentation.

■ 22–23 October 2007 **National Science Foundation (NSF) Regional Grants Conference**, Portland, Oreg., U.S.A. Sponsors: NSF; Portland State University. (Conference Coordinator; Tel.: +1-703-465-5736; E-mail: nsf_regional@nsf.gov; Web site: http://www.nsf.gov/publications/pub_summ.jsp?ods_key=reggrntsconf07)

This two-day conference is particularly important for new faculty, researchers, and administrators who want to gain key insight into a wide range of current issues at NSF, including the state of current funding, new and current policies and procedures, and other administrative issues. Highlights include discussions about new programs and initiatives; future directions and strategies for national science policy; proposal preparation; cross-disciplinary and special interest programs; and conflict of interest policies.

AGU JOURNAL HIGHLIGHTS

Ocean supergyre in the Southern Hemisphere Mid-latitude oceanic circulation in the southern hemisphere is traditionally thought to consist of basin-wide but distinct gyres contained within the Indian, Pacific, and Atlantic oceans. However, model simulations suggest that these gyres are linked by a global-scale 'supergyre' that transfers water to all three ocean basins. *Ridgway and Dunn* located this supergyre from a thorough analysis of temperature and salinity profiles collected since 1950 between 60°S and the equator. Water flows at intermediate depths from the Pacific to the Indian Ocean through a pathway around Tasmania, an observation supported by models but not fully documented by previous field research until now. Consistent with previous observations, they found that in the upper layers, Pacific Ocean water principally flows through the Indonesian archipelago into the Indian Ocean. Water from the Indian Ocean then leaks into the Atlantic Ocean around the southern tip of Africa. A pathway on the northern edge of the Antarctic Circumpolar Current returns the gyre waters back to the Pacific. The supergyre is a central agent for distributing intermediate water around the global ocean. (*Geophysical Research Letters*, doi:10.1029/2007GL030392, 2007)

Synchronized chaos: Mechanisms for major climate shifts In the mid-1970s, a climate shift cooled sea surface temperatures in the central Pacific Ocean and warmed the coast of western North America, bringing long-range changes to the Northern Hemisphere. After this climate shift waned, an era of frequent El Niños and rising global temperatures began. Understanding the mechanisms driving such climate variability is difficult because unraveling causal connections that lead to chaotic climate behavior is complicated. To simplify this, *Tsonis et al.* investigated the collective behavior of known climate cycles such as the Pacific Decadal Oscillation, the North Atlantic Oscillation, the El Niño/Southern Oscillation, and the North Pacific Oscillation. By studying the last 100 years of these cycles' patterns, they found that the systems synchronized several times. Further, in cases where the synchronous state was followed by an increase in the coupling strength among the cycles, the synchronous state was destroyed, after which a new climate state emerged, associated with global temperature changes and El Niño/Southern Oscillation variability. The authors showed that this mechanism explains all global temperature tendency changes and El Nino variability in the 20th century. (*Geophysical Research Letters*, doi:10.1029/2007GL030288, 2007)

—MOHI KUMAR, Staff Writer

More journal highlights can be found at http://www.agu.org/journals/gl/.

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ADVERTISING INFORMATION

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Ads with "Reply by" deadlines that are less than 14 days from the publication date will not be accepted.

Display and in-column advertising specs, pricing, and submission guidelines can be found on-line at www.agu.org/pubs/eosadinfo.html.

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Email: advertising@agu.org Phone: +1-202-777-7536 Facsimile: +1-202-777-7399

"Positions Available" and "Student Opportunities" are updated every Tuesday and listed on our Web site, accessible to AGU members.

www.agu.org

POSITIONS AVAILABLE

Atmospheric Sciences

Post-Doctoral Scientist. The Center for Ocean-Land-Atmosphere Studies (COLA) is seeking applicants for a post-doctoral position in regional climate modeling.

The successful candidate will conduct dynamic downscaling of the NCEP CFS coupled seasonal forecasts for both the North American and the South American monsoons. This project will also involve assessing the potential for dynamic downscaling of seasonal forecasts for hydrological forecasts for some of the major river basins in the domain. Expertise in either the North American or the South American monsoon is preferred. A Ph.D. in atmospheric sciences, hydrology or a related discipline is required. Familiarity with coding and running regional atmospheric models, programming experience in FORTRAN and familiarity with UNIX are required. Please send an application with curriculum vitae, statement of research interests, and arrange to send three reference letters by 15 September 2007 to:

NAM & SAM Search Committee
Center for Ocean-Land-Atmosphere Studies
4041 Powder Mill Road, Suite 302
Calverton, MD 20705-3106
Fax: (301) 595-9793
Email: namsam@cola.iges.org

COLA is a center in the Institute of Global Environment and Society (www.iges.org) located in the suburbs of Washington DC, together with the Center for Research on the Environment and Water and the George Mason University Climate Dynamics department, and is in close proximity to several federal labs and agencies. COLA is an equal opportunity employer.

Biogeosciences

Biogeochemistry, Ecosystems, and Climate Research at Princeton University. We invite applications for several postdoctoral or more experienced researcher positions involving model and data based studies of ocean, atmosphere, and terrestrial biogeochemical cycles with relevance to the carbon cycle, climate change, and the response of ocean life to climate change. Areas of particular interest include but are not limited to: Southern Ocean processes; use of observations and models to infer the spatial and temporal distribution of carbon sources and sinks; applications of satellite observations; and response of ocean biology to global warming, including fisheries. The successful candidates will join a vigorous interdisciplinary research group and will be able to take advantage of a wide range of related research at Princeton University and GFDL/NOAA.

Applicants are asked to send vitae, a statement of research experience and interests, and names of at least 3 references to Jorge Sarmiento c/o Laura Rossi (lrossi@princeton.edu), Atmospheric and Oceanic Sciences Program, Princeton University, 300 Forrestal Road, Princeton, NJ 08540. We will begin reviewing applications as soon as they are received, and continue until the positions are filled. Princeton University is an Equal Opportunity/Affirmative Action employer.

For general information about applying to Princeton University and how to self-identify, please see http://www.princeton.edu/dof/about_us/dof_job_openings.

Geochemistry

LA-ICPMS Lab Manager (Job # 38464), Arizona LaserChron Center. The University of Arizona seeks a highly motivated scientist to serve as manager of the Arizona LaserChron Center, which is a multi-user facility that focuses on U-Th-Pb geochronology by laser ablation-MC-ICPMS. Responsibilities would include: (1) directing installation of a new multicollector ICPMS and Excimer laser, (2) developing new analytical techniques and applications using an existing multicollector ICPMS (GVI Isoprobe) and Excimer laser (DUV193), (3) performing minor maintenance and overseeing major repairs of these instruments, (4) supervising visits of research scientists, and (5) conducting independent research. The position is full-time and permanent. Applicants should have a MS or PhD in Earth Science or Chemistry, and have demonstrated experience with ICPMS instrumentation. Applications will be reviewed beginning 15 August 2007 and will continue until the position is filled.

Applications should be submitted at https://www.uacareertrack.com for Job Number 38464. For additional information, please visit the Arizona LaserChron Center website (www.geo.arizona.edu/alc) and contact George Gehrels (ggehrels@email.arizona.edu) or Joaquin Ruiz (jruiz@email.arizona.edu). The University of Arizona is an equal opportunity, affirmative action organization.

Ocean Sciences

Physical Oceanographer, Prince William Sound Science Center (PWSSC), Cordova, Alaska. Full-time position with excellent benefit package. Position partially funded by a grant from the Oil Spill Recovery Institute (www.pws-osri.org) to conduct routine oceanographic transects, maintain fixed moorings and meteorological arrays, and telemetry networks as part of the PWS Observing System (ak.aoos.org/pws/). Requirements: PhD in physical oceanography OR documented experience relevant to the duties for conducting oceanographic research projects. Seeking self-motivated candidate capable of working both independently and within an interdisciplinary team. Review detailed job description at www.pwssc.org including the application process. Application deadline: August 31, 2007. E-mail contact: bird@pwssc.gen.ak.us.

Physical Oceanographer/Permanent Research Position. Rossby Centre, Swedish Meteorological and Hydrological Institute seeks a scientist (http://www.smhi.se) to work on advanced ocean modelling and analyses for climate and climate change applications in the Baltic Sea region and the Arctic. Send applications (ref. no. 1488) before 20 August 2007 to SMHI, SE-60176 Norrkoping, Sweden, or by email to registrator@smhi.se.

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U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration Atlantic Oceanographic and Meteorological Laboratory
4301 Rickenbacker Causeway Miami FL 33149

Physical Oceanographer position
ZP-IV or ZP-V (GS 13-15 equivalent)

The Physical Oceanography Division (PhOD) of NOAA's Atlantic Oceanographic and Meteorological Laboratory (AOML) is seeking a researcher with expertise in physical oceanography and the ocean's role in climate variations. The successful applicant will have significant research publications in the refereed literature, a history of success in obtaining funding and conducting research projects, the ability to organize and to promote research projects, and international recognition as a leading scientist in the fields of oceanography or climate research. This position will be filled at the ZP-IV or ZP-V level (GS 13-15 equivalent) depending on experience and credentials.

NOAA/AOML is part of the US Department of Commerce and is located in Miami, Florida. AOML's mission is to conduct basic and applied research in oceanography, tropical meteorology, and atmospheric and oceanic chemistry. This research seeks to understand the physical characteristics and processes of the ocean and the atmosphere, both separately and as a coupled system. The research emphasis of PhOD is collection of in-situ data and the use of these data and numerical model results to increase understanding of a wide variety of ocean and climate processes, with the ultimate goal of developing climate forecast capabilities.

For more information, contact Cynthia Wilder, cynthia.wilder@noaa.gov, or visit the web site http://www.usajobs.opm.gov/ reference Announcement Numbers OAR-AOML-2007-0011 and OAR-AOML-2007-0013.

Tenure Track Faculty Position
SPACE PHYSICS

UNIVERSITY OF ALASKA FAIRBANKS

The Geophysical Institute and the Physics Department at the University of Alaska Fairbanks seek applicants to fill a joint tenure-track position in space physics and/or aeronomy. The position offers opportunities for research at the Geophysical Institute as a member of the Space Physics and Aeronomy Group and carries the responsibility for teaching as a faculty member in the Physics Department. The appointment is intended at the level of assistant professor. Appointments to higher rank may be considered for qualified candidates. The successful applicant will pursue externally funded research in physics of the thermosphere, ionosphere, and/or magnetosphere.

Areas of research that are currently pursued by the Geophysical Institute's Space Physics and Aeronomy Group include space plasma simulations, ionospheric modeling, optical and radar observations of the ionosphere and aurora, rocket experiments, and data analysis of spacecraft- or ground-based observations.

Research facilities include an instrumentation laboratory, machine and electronic shops at the Geophysical Institute, the Poker Flat Research Range with rocket launch facilities, the Davis Science Center, the Lidar facility, and NSF's Poker Flat Incoherent Scatter Radar (PFISR), and the Arctic Region Supercomputing Center. Opportunities exist for collaboration with other groups within the Geophysical Institute, such as Atmospheric Sciences, as well as other units of the University, notably the School of Engineering.

A complete job description and application instructions can be found at the following web page:
www.uakjobs.com/applicants/Central?quickFind=59535
If you have any questions, please contact Lisa Yancey, HR Consultant, Geophysical Institute, University of Alaska Fairbanks, P.O. Box 757320, Fairbanks, AK 99775-7320, (907) 474-7791 or e-mail: Lisa.Yancey@gi.alaska.edu.

The University of Alaska Fairbanks is an Equal Opportunity/Affirmative Action Employer.

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Solid Earth Geophysics

Geophysics. The Department of Geology at Southern Illinois University Carbondale invites applications for a tenure-track position in geophysics at the assistant professor level, starting Aug. 16, 2008. Please visit our web site http://www.science.siu.edu/geology/geophysicsposition.html for more information. SIUC is an affirmative action/equal opportunity employer that strives to enhance its ability to develop a diverse faculty and staff and to increase its potential to serve a diverse student population. All applications are welcomed and encouraged and will receive consideration.

Microseismic Geophysicist.

Description:

Pinnacle Technologies, a dynamic leader in providing integrated hydraulic fracturing diagnostics, consulting and software to E&P companies is looking for a Geophysicist to join our microseismic fracture mapping team. The candidate will perform real-time microseismic data analysis/interpretation using state-of-the-art software to determine fracture geometry and complexity.

Additional responsibilities will include working closely with Pinnacle engineers to provide stimulation solutions for our customers. You must work well with others and have a client-first service provider personality.

Required Experience:

A background including seismic experience is preferred. Previous microseismic experience is a real plus

Required Education:

A BS/MS/PhD in geophysics or a closely related field.

When submitting your resume to humanresources@pinntech.com please note in the Subject line: Microseismic Geophysicist.

Professor of Applied Seismology, Department of Geosciences, University of Houston. The University of Houston is seeking a distinguished geophysicist with an international reputation and strong research background to fill a position in Applied Seismology at the full professor level in the Department of Geosciences. Applicants should have extensive practical experience in the application of seismic methods and seismic processing, a broad background in the geophysical sciences, and a distinguished national/international reputation for innovative applied and basic research in reflection seismology. Candidates for the position should be able to teach at both the undergraduate and graduate levels. The successful candidate will be expected to develop a vigorous research program, as well as a strong record of publication and external funding.

The candidate will have access to a full range of teaching and research facilities within the Geosciences Department and University. Departmental computing facilities include a modern 2 Sparc 880 server networked to some 25 SUN Ultra workstations and 25 PC/Linux workstation with 20 Tbytes of disk space. The Department also maintains eight 48-node Xeon or Dual-core Beowulf clusters within its own high performance computing center. The University also maintains accessible high-performance computing facilities and 3D visualization facilities. In addition, the department maintains licenses to a full suite of commercial seismic modeling, processing and interpretation software provided by vendors including Schlumberger/Geoquest, Paradigm Geophysical, Geocenter, Hampson-Russell, Prism Geophysics, Seismic Microtechnologies, Halliburton, and others.

Candidates should send an application consisting of a full curriculum vitae, a statement of research and teaching interests, supplementary materials that address qualifications, and arrange to send four letters of reference to:

Dr. John F. Casey, Chair,
Department of Geosciences
College of Natural Sciences and Mathematics
Room 312 Science Research 1
University of Houston
4800 Calhoun Rd.
Houston, Texas 77204-5503.

Further information can be requested by calling (713) 743-3399, ext 4 and by viewing the departmental web page http://www.geosc.uh.edu/. Candidate evaluations will begin as soon as received and continue until the position is filled. We expect to fill the position as soon as Sept. 1, 2007.

The University of Houston is an Equal Opportunity/Affirmative Action Employer. Minorities, women, veterans, and persons with disabilities are encouraged to apply.

Space Physics

Assistant Research Physicists ($56,100-$62,300) Space Sciences Laboratory, University of California, Berkeley. The Space Sciences Laboratory at the University of California, Berkeley, anticipates one or more openings at the level of Assistant Research Physicist for outstanding scientists to work on analysis, interpretation, and simulation of particle and fields data from instruments on the Cluster, Polar, Wind and/or STEREO satellites. Applicants must have a Ph.D. in Physics, with at least two years of experience in analyzing and interpreting space plasma data. Expertise in the physics of plasma turbulence, magnetic reconnection, and/or collisionless shocks will be especially appreciated. These positions are available for two years, with the possibility of renewal, and salaries will be commensurate with experience. Interested applicants should submit their curriculum vitae, list of publications, and names of three references by August 31, 2007, to Ms. Kate Harps, Space Physics Research Group, Space Sciences Laboratory, 7 Gauss Way, University of California, Berkeley, CA 94720-7450. AAE/EOE

Postdoctoral Research Associate in UV Irradiance Modeling. The Laboratory for Atmospheric and Space Physics (LASP) at the Univ. of Colorado has an opening in UV solar irradiance physical modeling. He/she will participate in developing physics based models of solar irradiance variations in the UV range, and in creating operational tools (using C++ and OO code) for forecasting these irradiance variations. This work involves spectroscopy, observation, and modeling of the solar electromagnetic radiation at all wavelengths for connecting solar physical processes to the spectral and total irradiance on Earth and other planets.

Applications are due Aug. 31. For details see http://lasp.colorado.edu/employment/science/uv_irr_model_fontenla.html, or contact Dr. Juan Fontenla (juan.fontenla@lasp.colorado.edu).

Interdisciplinary/Other

Alignment & Metrology Project Manager, #070070. Provides technical expertise and authoritative advice on all experimental and accelerator systems at Fermilab with regard to the areas of geodetic and alignment projects, operations and studies. Acts as alignment and metrology project manager with the following duties: evaluates proposals for experimental and/or accelerator projects to determine geodetic and

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School of Oceanography
University of Washington

Assistant Professor Positions in Marine Geology and Geophysics

The School of Oceanography at the University of Washington invites applications for two tenure-track Assistant Professor positions in marine geology and geophysics. These positions are intended to complement School-wide cross-disciplinary themes focused on coastal ecosystems, climate change and extreme environments, and a future emphasis on ocean observing systems. We seek candidates with demonstrated expertise and innovative research in

- marine hydrogeology, including physical and chemical processes
- marine stratigraphy, using observational and modeling approaches

Candidates with strong quantitative skills who employ integrative approaches are particularly encouraged to apply. The successful candidates will be expected to develop outstanding research programs and to excel in undergraduate and graduate teaching and mentoring.

A Ph.D. is required on the date of appointment. Applicants should submit a curriculum vita, statements of research and teaching interests, and the names of four references to:

Dr. Russell E. McDuff, Director
School of Oceanography
Box 357940
University of Washington
Seattle, WA 98195-7940
mcduff@ocean.washington.edu

Review of applications will begin September 10, 2007.

These are full-time positions. University of Washington faculty engage in teaching, research and service. The University of Washington is an affirmative action, equal opportunity employer. The University is building a culturally diverse faculty and staff and strongly encourages applications from women, minorities, individuals with disabilities and covered veterans. The University of Washington, a recipient of the 2006 Alfred P. Sloan award for Faculty Career Flexibility, is committed to supporting the work-life balance of its faculty.

CReSIS
Center for Remote Sensing of Ice Sheets
KU THE UNIVERSITY OF KANSAS

Associate Director – Education and Diversity, Outreach, and Knowledge Transfer

The Center for Remote Sensing of Ice Sheets (CReSIS) (**www.cresis.ku.edu**) at the University of Kansas invites applications for a full-time Associate Director, effective August 2007. The Associate Director reports directly to the Center Director and Deputy Director and will be expected to plan, implement, manage, and track initiatives of the Center's education outreach and knowledge transfer programs. Day-to-day activities include recurring interaction with the Center's graduate and undergraduate students; work with Center staff to develop/maintain a compelling web presence of the Center; oversee of K-12 outreach; strengthen distance learning efforts; manage summer research experiences for undergraduates, and international research experiences programs; and manage graduate student recruitment. Making the Center's science and technology development activities and products highly visible, transparent, compelling and accessible to a broad audience is critical. Seeking additional funding by proposal writing to support new initiatives is also expected.

Interested applicants should contact Ms. Tommie Marie Cassen at: tcassen@cresis.ku.edu. A full description & application requirements may be found at **https://jobs.ku.edu** under Position No. 00206340. Women and minority candidates are specifically invited and encouraged to apply. EO/AA Employer.

soest
School of Ocean and Earth Science and Technology
AT THE UNIVERSITY OF HAWAI'I AT MĀNOA

Six Ocean Observing Science and Engineering Faculty

The School of Ocean and Earth Science and Technology (SOEST) invites applications for six, newly appropriated tenure-track positions. We seek outstanding candidates whose combined skills improve SOEST capabilities in the following areas: ocean modeling and data assimilation; ocean observing technologies (autonomous vehicles, ocean gliders, cabled observatories, ocean acoustics, and coastal/seafloor geodesy); coastal and/or watershed processes (hydrodynamics, sediment transport, hazards); and integrating data management and visualization of ocean observations to yield innovative public products.

SOEST is launching a Pacific regional ocean observing system that will form the basis for ground-breaking new research programs, operational on-line products focused on the safe, clean, and productive capacity of Hawai'i's ocean and coasts, and training of the next generation's workforce. We seek pioneering and enthusiastic scientists and engineers who will interact synergistically and with existing faculty to form a dynamic team of advanced researchers, specialists, and educators to fulfill the vision of ocean observing in Hawai'i and the Pacific.

Appointments will be at a range of levels (Assistant to Full Professor) and classifications (Instructional, Research and Specialist) based on the profile of the very best applicants. Successful candidates will have an established record of publication in international peer-reviewed scientific journals, or equivalent patents/products/programs, recognized high potential in research funding, superior communication abilities, and the capacity to build a flourishing interdisciplinary research program.

Minimum requirements for these positions include a Ph.D. or equivalent experience in a related scientific or engineering field.

Information about SOEST can be found on our web site at **www.soest.hawaii.edu**.

Applicants should supply curriculum vitae, including a list of publications, details regarding research funding, information describing teaching experience and interests, and a summary of research interests. Of special interest to the Search Committee will be statements of strategy to build collaborative programs with the new team of hires in addition to existing SOEST faculty. Mail addresses, phone numbers, and email addresses of at least three references should be sent to:

Ocean Observing Faculty Search
School of Ocean and Earth Science and Technology
University of Hawai'i at Mānoa
1680 East-West Road, POST 802
Honolulu, HI 96822, USA

For additional information call: (808) 956-9110.

Review of applicants will begin September 15, 2007.
The University of Hawai'i is an EEO/AA employer.

Categories: Ocean Sciences

soest
SCHOOL OF OCEAN AND EARTH SCIENCE AND TECHNOLOGY

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alignment requirements; develops high accuracy medium and large scale geodetic networks to meet experimental criteria; evaluates technological advancements in the applications of geodesy, alignment, and mapping systems, such as GPS, laser tracking interferometry, and photogrammetry to higher accuracy requirements; develops and improves computer software programs required for data compilation needs, quality control analyses, and entry and validation for database and archival requirements; acts as liaison between experiments/projects and analyzes potential requirements relative to the use of Alignment and Metrology Group resources; task manages alignment/survey crews in the field including scheduling, safety, and quality control. Recommends changes in procedures to improve quality of methods, techniques and products. Prepares technical correspondence and reports, authors or co-authors scientific papers for publication or for presentation at technical meetings, conferences, and workshops.

Requirements:

- Master of Science Degree in geodesy and/or metrology.

- 5 or more years of experience in geodesy and/or metrology.

- Excellent English verbal and written communication skills.

- Experience in industrial alignment and/or metrology is a plus.

Physical Activity/Requirements:

Human Factors - Heights, Mental Concentration, Repetitive Motion, Sitting, Standing, Stair Climbing, Visually Demanding, Work Outdoors

Chemical Factors - Combustion Engines, Dust, Epoxies, Fumes, Lead, Pesticides, Solvents

Physical Factors - Confined Space, Cryogens, Environment (Cold, Dry, Hot, Wet), High Magnetic Field, High Noise Level, High Voltage, Ionizing Radiation

Personal Protective Equipment - Eye/Face Protection, Foot Protection, Hand Protection, Hearing Protection, Respirators

Biological Factors - Animals, Insects, Poisonous Plants

Founded in 1967, Fermi National Accelerator Laboratory ("Fermilab") advances the understanding of the fundamental nature of matter and energy by providing leadership and resources for qualified researchers to conduct basic research at the frontiers of high energy physics and related disciplines.

CSIRO Marine and Atmospheric Research

Research Scientist (Modelling) 2007/571
$75K - $81K plus Superannuation
Location: Melbourne

You will join a team that undertakes research and applications work involving coupled meteorological and air quality models. A major component of the team's work is maintenance and development of complex models for application to urban and industrial air quality problems.

The successful applicant will need to be able to work collaboratively with research scientists and external collaborators, adapt to change and be able to work across a range of computing platforms. Duties include provision of science-based advice and feedback to external clients, and planning and implementation of air quality studies for internal and external projects.

A degree in mathematics or physics with a PhD is essential. Experience in mathematical computing and achievement in mathematical descriptions of fluid mechanics with an emphasis on meteorology will be highly advantageous.

Support Scientist (Greenhouse Gas Measurements) 2007/572
$48K - $61K plus Superannuation
Location: Melbourne

Work as part of a team that conducts research into the global biogeochemical cycles of greenhouse gases. A major focus of the team's work is to establish atmospheric distributions of these gases and some of their isotopes by analysing air samples from a global network of sampling stations and using the measurements in interpretation and reporting activities, with an emphasis on experimental work. The focus of this position is to assist in the implementation of upgraded analytical techniques, and to assist in the implementation and maintenance of improved methods for data/management processing.

The successful applicant will have a degree in Science or Engineering. Previous experience with and knowledge of analytical chemistry, especially gas chromatography, infra-red absorption techniques, and/or mass spectrometry will be highly regarded.

Technical Support (Climate Analysis) 2007/614
$36K - $46K plus Superannuation
Location: Melbourne

As a part of a dynamic and intellectual team, you will work in the area of climate variability and climate change impact on water resource. The successful applicant will have a working knowledge of how climate data are stored and processed, and possess computing skills in data analysis and data visualization. Familiarity with basic knowledge of Australian climate dynamics on a regional and Australia-wide scale will be an advantage.

Access Support Scientist Positions

CSIRO, the Bureau of Meteorology and Australian universities are jointly developing a climate system model to be known as the Australian Community Climate and Earth System Simulator ("ACCESS"), incorporating atmosphere (including atmospheric chemistry), ocean (including oceanic biogeochemistry), sea ice and land-surface components. The applications of this modelling system will span near term weather prediction, seasonal prediction and climate change projection, including analysis of factors affecting the rate of climate change and its impact on human activities and ecosystems.

Support Scientist (Computing) 2007/615
$48K - $61K plus Superannuation
Location: Melbourne

The position will provide technical support to Research Scientists by assisting in the development of the supporting software environment for the ACCESS model. The position will also require collaboration with external partners, in particular staff at the High Performance Computer & Communication Centre (HPCCC).

The successful candidate will have well developed skills in UNIX shell scripting and other scripting languages (e.g., tcl or python) and FORTRAN 90 (preferred) or C++ programming. The ability to document results and communicate effectively with colleagues and clients in order to meet project goals and timelines is also required.

Support Scientist (Computing/Ocean Biogeochemical Modelling) 2007/679
$63K - $72K plus Superannuation
Location: Hobart

The position will provide technical support to Research Scientists by assisting in the development, running and analysis of marine biogeochemical models for the full ACCESS Model being developed for climate change projections. The role relies on strong relationships being maintained internally with several of the Division's science groups and externally with staff at the High Performance Computer & Communication Centre (HPCCC).

The position will also require interacting with the ocean and sea ice components of the ACCESS Model. The incumbent will need to be able to work collaboratively with research scientists and external collaborators, adapt to change and be able to work across a range of computing platforms.

For selection documentation and details on how to apply visit www.csiro.au/careers or email csiro-careers@csiro.au

Environmental History. The Department of History and the Program of Environmental Studies at Yale University intend to make a tenure-track Assistant Professor appointment in environmental history broadly construed, area and era open, to begin July 1, 2008. Applications are invited from historians with strong potential for achievement in scholarship, intellectual leadership, and graduate teaching. The successful candidate will instruct students in both history and environmental studies, which is an interdisciplinary undergraduate major at Yale. Yale is an affirmative action/equal opportunity employer. Yale values diversity among its students, faculty, and staff and especially welcomes applications from women and members of underrepresented minorities. Ph.D. preferred. Applications should be sent by October 15, 2007, to Environmental History Search, Department of History, c/o Ms. Dana Lee (dana.lee@yale.edu) Yale University, PO Box 208324, New Haven, CT 06520-8324. Send application letter, CV, statements of research and teaching interests, writing sample and letters of reference. Contact Information:

Environmental History Search
Yale University
Department of History, c/o dana.lee@yale.edu
PO Box 208324
New Haven, CT 06520-8324
203-432-1364
203-432-7587

Geospatial Analyst/ Application Developer (Full-time)

Job Responsibilities:

- GIS data (imagery, terrain, and vector) acquisition, conversion, and development
- GIS database design and development
- Development of tools, software, and processes to execute the preparation of data for publishing in the ArcGIS, Google Earth, and Google Maps
- User interface development and application integration
- GIS support to geoscientific, hydrologic, and environmental consulting projects, as needed

Requirements:

- Degree in geoscience, computer science or environmental field required, MS or PhD preferred. Fluency with vector, image and/or terrain data required.
- Experience developing innovative methods to visualize large and complex geospatial data sets required.
- Strong HTML/CSS/Javascript experience required.

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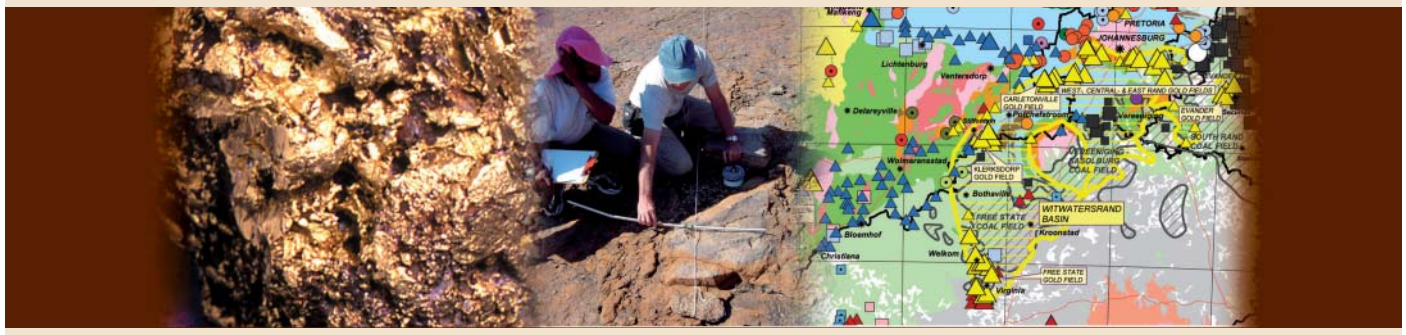
Council for Geoscience
LEADING EARTH-SCIENCE SOLUTIONS



The Council for Geoscience (CGS) is the national geoscience institution specializing in geoscience research both locally and globally. With its Head Office situated in Silverton Pretoria, it prides itself of a winning team of specialist scientist within the various fields of Geology.

Suitable, qualified and experienced candidates are invited to apply to the following positions:

Seismologist - Seismic Hazard (Ref 01)

Location: Head Office (Pretoria)

Reporting Line: Manager – Seismology Unit

Overall Job Purpose: Assessment of seismic hazard and risk, and development of techniques and software applications for research and commercial purposes

Key Responsibilities:

- Research existing methodologies in seismic hazard and risk.
- Conduct seismic hazard analysis as part of engineering designs.
- Develop seismic hazard and risk models for application in industry.
- Write and publish scientific reports. These include peer reviewed publications in scientific journals.
- Provide consulting services to commercial clients.
- Train, mentor and direct the work of junior staff.
- Willingness to travel and undertake work assignments elsewhere in Africa.

Qualification and Experience:

- MSc with 8 years minimum of relevant experience, or recent PhD education with 2-3 years experience in seismic hazard assessments.
- Experience in either probabilistic or deterministic seismic hazard assessments.
- Professionally registered or eligible for professional registration.
- Experience of modern digital databases and the use of multidisciplinary data (such as terrain observation, satellite imagery, radar, airborne geophysics) will be an added advantage.
- Demonstrated ability to make presentations and write reports for publication of research results.
- Experience of the African continent (geology terrain and seismotectonics) is recommended.
- Computer literacy in MS Office suite.
- GIS literacy is recommended.
- Must have a valid driver's license.

Seismologists (Ref 02)

Location: Head Office (Pretoria)

Reporting Line: Manager Seismology

Overall Job Purpose: Conducting programmes in seismology, especially seismic data analysis and induced seismicity.

Key Responsibilities:

- Development of new techniques used in seismic data analysis.
- Conduct advanced investigations supported by research in a variety of fields (mathematics, statistics and numerical methods).
- Writing computer programs for application of new techniques in seismic data analysis.
- Lead scientific programmes, especially in mine and other induced seimicity.
- Provide scientific guidance in research and project execution.
- Compile project proposals.
- Provide extensive teaching and direction to junior scientists.
- Provide input to public and private sector organizations.
- Maintain and foster good relationships with all organization and institutions which the CGS is involved with.
- Presentations of results in the form of technical papers and participating in seminars both internally and externally.

Qualification and Experience:

- Ph.D in Seismology and 5 years relevant experience.

Interested applicants are requested to e-mail their CV's to **careers@geoscience.org.za**. Please quote position reference when submitting your application.

CLOSING DATE: 20 AUGUST 2007

The Council for Geoscience is an equal opportunity employer, and adheres to affirmative action principles.

Note: Correspondence will only be entered into with shortlisted candidates.

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• Experience with ArcGIS and related ESRI products required.
• Experience with geo/GIS standards, file formats, tools (e.g., OGC, ESRI, KML, GML, geoRSS) required.
• Experience with Web 2.0 technologies including news aggregation (via RSS and geoRSS), social networking, and/or content management systems required.
• Experience (and strong working knowledge of) developing complex, dynamically-generated KML preferred.
• Experience with C++, Python, and/or Java preferred.
• Strong Linux knowledge and scripting (perl or shell) skills preferred.
• Experience with Google Maps mashups/API desired.
• Experience with Web-based GIS mapping desired.
• Web design experience strongly desired.
• SketchUp model creation experience desired.
• Excellent written and verbal communication, organizational, and time-management skills required.

Job Location: Tucson, Arizona
Salary Range: Appropriate to qualifications and experience
Contact Information:
Julia Armstrong D'Agnese, CEO
Earth Knowledge, Inc.
500 N. Tucson Blvd., Ste. 150
Tucson, Arizona 85716
Email: julia@earthknowledge.net
Phone: 520-829-7127

Post Doctoral Fellow, CSIRO Petroleum Resources, Clayton, VIC
$65K - $72K plus Superannuation
Reference Number: 2007/661

CSIRO Petroleum is an independent supplier of R&D to Australia's oil and gas industries. Research covers the development of oil and gas resources, from exploration to production. The Division seeks to employ a Post Doctoral Fellow within the Hydraulic Fracturing group. The Post Doctoral Fellow will be required to work on a project to develop a new capability in hydraulic fracture monitoring and to investigate the effect of scale on the fracture toughness of rocks. We are seeking a flexible individual with skills in the areas of geophysical methods, inverse problems, and rock/fracture/fluid mechanics.

For selection documentation and details on how to apply visit www.csiro.au/careers or email csiro-careers@csiro.au.

Postdoctoral Fellowship in Exploration Geophysics. A postdoctoral fellowship in exploration geophysics is to be awarded to an exceptional applicant to begin Fall of 2007 in the Department of Earth & Environmental Sciences (EES) at Wright State University, pending availability of funds. This successful candidate will lead a project to improve imaging of salt diapirs from marine seismic data and participate in land seismic acquisition projects. The successful candidate will ideally have expertise in 3-D seismic processing and interpretation, and experience with Schlumberger Geoframe and Petrel or equivalent software. We are seeking highly motivated individuals would can serve as the project manager and interface with petroleum scientists, professors, graduate students, and the daytaOhio Center for Information Management. The candidate will have the opportunity to utilize state-of-the-science Schlumberger mapping software, latest model 3D visualization "cave" software and facilities, and access to a 24 bit ARAM recording unit. The EES departmental space just completed a multimillion dollar renovation. Wright State has ~17,000 students with over $60 million per year in extramural funding and located in the Dayton, Ohio metropolitan area. For more information see www.wright.edu/ees. Candidates must have a Ph.D. in a field related to the expertise areas above prior to August 2007. The position is for two years and may be renewed subject to available funding. The salary will be commensurate with experience. Send an electronic letter of application with a statement of research interests, CV, and names and contact information for 3 references to Cindy Harrison at cindy.harrison@wright.edu.

Review of applications will begin August 1 and continue until the position is filled. The start time for this position is flexible but Fall 2007 is desirable. Wright State University is an Affirmative Action Equal Opportunity Employer.

Postdoctoral Research Associate in Watershed Processes. A postdoctoral research associate position is available for qualified individuals with research experience and interests in surface and/or groundwater interactions with watershed conditions, pending availability of funds. The successful candidate will have expertise in one or more of the following areas: freshwater biogeochemistry, modeling, hydrology, sediment transport, wetland systems, and/or groundwater-surface water interactions. The position has 3 primary responsibilities: 1) to develop new research approaches and initiatives to support interdisciplinary research; 2) to provide limited assistance in training graduate students in analytical, computational, and/or field methods; and, 3) to publish findings in the peer-reviewed literature. The candidate will have the opportunity to utilize facilities for remote sensing, GIS, 3D visualization facilities, chemical analyses, surface and subsurface water sampling, aquatic toxicology, and utilize nearby experimental watersheds and wetlands. The Department of Earth & Environmental Sciences recently completed a multimillion dollar renovation. Wright State has ~17,000 students with over $60 million per year in extramural funding and located in the Dayton, Ohio metropolitan area. For more information see www.wright.edu/ees. Candidates must have a Ph.D. in a field related to the expertise areas above prior to August 2007. The position is for two years and may be renewed subject to available funding. Send an electronic letter of application with a statement of research interests, CV, and names and contact information for 3 references to Cindy Harrison at cindy.harrison@wright.edu. Review of applications will begin August 1 and continue until the position is filled. The start time for this position is flexible but starting in Fall 2007 is desirable. Wright State University is an Affirmative Action Equal Opportunity Employer.

Project Earth Scientist/Technical Coordinator (Full-time).

Job Responsibilities:
• Communicate with and integrate information from multiple scientists and stakeholders.
• Assist in the development of technical / non-technical presentations and reports.
• Plan, provide technical guidance to, and oversee the work of project personnel engaged in environmental investigations including technical and GIS-support staff.
• Evaluation and interpretation of earth and environmental science data and information.
• Synthesis of geologic, hydrologic, and other environmental science information for use in environmental models.
• Prepare / review technical reports and data for submittal to clients.
• Conduct other project related operational and administrative activities including, but not limited to, monitoring and reporting on monthly project progress and overseeing the work of project personnel.

Requirements:
• Degree in geoscience, or environmental field required, MS or PhD preferred.
• Considerable knowledge of physical and biological sciences (including geology, hydrology, climatology, ecology, and soils), physics, mathematics, and computer science required.
• Demonstrated experience with project management required.
• Experience with environmental modeling, computer data analysis applications, and conducting data analyses required.
• Experience with Geographic Information System (ArcGIS or related ESRI products) and other computer software needed to construct environmental models desired.
• Experience with environmental modeling, computer data analysis applications, and conducting data analyses required.
• Experience with Google Maps, Google Earth, and/or other Web based GIS mapping desired.
• Experience with Web 2.0 technologies including news aggregation (via RSS and geoRSS), social networking, and/or content management systems desired.
• Excellent organizational and time-management skills required.
• Ability to write and review both technical and non-technical reports for publication required.
• Ability to communicate on a professional level the results of technical investigations orally to both technical and non-technical audiences required.

Job Location: Tucson, Arizona
Salary Range: Appropriate to qualifications and experience
Contact Information:
Julia Armstrong D'Agnese, CEO
Earth Knowledge, Inc.
500 N. Tucson Blvd., Ste. 150
Tucson, Arizona 85716
Email: julia@earthknowledge.net
Phone: 520-829-7127

Senior Program Officer. World Wildlife Fund (WWF), the global conservation organization seeks a Senior Program Officer, Climate Change. The Senior Program Officer plans, manages, communicates, and implements project as part of the EpiCenter of Climate Adaptation and Resilience Building. Leads the development of successful freshwater adaptation field projects and manages other strategic efforts to build WWF's profile and knowledge around adaptation/resilience-building in order to protect nature from the impacts of climate change. Works under the supervision of the Chief Climate Change Scientist/Director of the EpiCenter of Climate Adaptation and Resilience Building and is part of the WWF Climate Change Global Program Unit.

Basic requirements include a graduate degree in a relevant field. Position requires a minimum of five years of work experience in freshwater conservation biology, freshwater ecology or freshwater climate change science. Candidates should be a strong persuasive communicator, in person and in writing and have proven ability to work with scientists and funding agencies. Demonstrated knowledge of fundraising and proposal development is a plus. Excellent organizational and project management skills required.

AA/EOE Women and minorities are encouraged to apply. To apply, please visit http://www.worldwildlife.org/about/jobs.cfm. Job# 28036

US Geological Survey, Central Region, Earth Surface Processes Team, Team Chief Scien-

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THE UNIVERSITY of WISCONSIN MADISON

Director of the Gaylord Nelson Institute for Environmental Studies

The University of Wisconsin-Madison, a major land-grant university committed to excellence in teaching, research and public service with a budget of $1.6 billion, student body of approximately 40,000 and faculty/staff of 20,000, invites nominations and applications for the position of director of the Gaylord Nelson Institute for Environmental Studies.

The director of the Nelson Institute, a member of the Deans' Council, reports to the chancellor and the provost, and provides general leadership and coordination in the broad area of environmental studies through the promotion of faculty collaboration and initiatives in interdisciplinary environmental scholarship and instruction.

The Nelson Institute, established in 1970, is an independent division of the university with the mission to promote understanding of the environment and to define and solve environmental problems and issues through leadership in interdisciplinary instruction, research, and outreach at all levels, from campus to global. Approximately 150 faculty members from more than 50 natural and social science, engineering, and humanities departments across the campus are affiliated. Besides offering more than 100 courses in partnership with the university's schools and colleges, the Nelson Institute administers three graduate degree programs (in conservation biology and sustainable development, environment and resources, and water resources management), four graduate-level certificate programs (in air resources management, energy analysis and policy, transportation management and policy, and the certificate for humans and the global environment) and an undergraduate certificate program (in environmental studies). Total enrollment in the graduate programs is approximately 200 students; enrollment in the undergraduate program averages approximately 300. The Nelson Institute is the administrative home for four interdisciplinary research centers (Center for Climatic Research; Center for Culture, History and Environment; Center for Sustainability and the Global Environment; and Land Tenure Center), and conducts a variety of outreach activities.

Please see the following web sites for information about the Nelson Institute and UW-Madison:

http://www.nelson.wisc.edu http://www.wisc.edu/

Candidates must possess a commitment to and vision for environmental leadership and the role of an interdisciplinary environmental institute in solving environmental problems from campus to global scales, and will be evaluated on the following professional and personal characteristics: commitment to the institute's mission, as well as to maintain and extend the scholarly values, academic breadth, and the diverse missions of a public research university through interdisciplinary scholarship and teaching, and outstanding leadership qualities including a record of successful leadership. The evaluation process will also consider collaborative leadership style; commitment to shared governance with faculty, staff and students; desire and ability to advance interdisciplinary environmental teaching, research, and public service; commitment to pursue and secure funding from public and private sources; ability to work with external constituencies including state and federal government, business, non-profit agencies, and community; a commitment to public service through dissemination of research results, support of the state's environmental interests, and support of the Wisconsin Idea. A record of academic scholarship and teaching that meets the qualifications for tenure at the level of full professor at UW-Madison is required. In addition and in keeping with the university's goals and objectives, candidates will be evaluated on their demonstrated commitment to the diversity of students, faculty and staff, to equal employment opportunity, affirmative action and non-discriminatory practices, and to advancing an inclusive climate that stimulates diversity.

Applications and nominations must be received by 15 August 2007 to ensure consideration. Later applications and nominations may also be considered. The committee strongly encourages applications and nominations of women and persons of underrepresented groups. Applicants should include a current resume or curriculum vita and a comprehensive cover letter that addresses how their strengths and experience match the qualifications for the position, and what they would see as challenges and opportunities of the position, as well as the names, addresses, e-mails, and telephone numbers of five references. Candidates will be informed before references are contacted. Please note that in accordance with Wisconsin statutes the names of nominees and applicants who explicitly request confidentiality will not be made public. However, the university is required to release the names and titles of the finalists who will be interviewed by the chancellor. Submit applications and nominations to:

Professor Kenneth Potter, Chair
Gaylord Nelson Institute for Environmental Studies Director Search and Screen Committee
133 Bascom Hall, 500 Lincoln Drive
Madison, WI 53706-1380

608-262-1677; Confidential FAX: 608 265-7806; Email: njmoltum@bascom.wisc.edu

The University of Wisconsin-Madison is an Equal Opportunity, Affirmative Action Employer.

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tist; Supervisory Physical Scientist (GS-1301-15) or Supervisory Geophysicist (GS-1313-15) or Supervisory Geologist (GS-1350-15). The U.S. Geological Survey (USGS), Central Region invites applications for the position of Team Chief Scientist, Earth Surface Processes Team, in Lakewood, Colorodo. The Team Chief Scientist supervises a staff of approximately seventy (70) research and operational personnel. Stong scientific leadership and managerial skills are essential. Also requied is a comprehensive knowledge of the scientific principles, concepts, and practices that apply to the Team's principal areas of investigation, which include the geologic mapping, regional geologic and tectonic synthesis, geochronology and isotope studies, geomorphology, paleclimate research, hydrogeology, ecosystem studies, pedology, paleoseismic analysis, and materials properties characterization. Strong written and oral communication skills are required in order to effectively convey the USGS results to other Federal and State agencies, universities, and other institutions, and to engender their support and participation of USGS programs.

This is an interdisciplinary position that can be filled as either Supervisory Physical Scientist or Supervisory Geophysicist or Supervisory Geology. The vacancy announcement numbers for this position are: CR-2007-0516, CR-2007-0518, CR-2007-0520, CR-2007-0522, CR-2007-0524, and CR-2007-0526. Applications will be accepted beginning July 16, 2007, through August 31, 2007. For qualification and application details visit http://www.usajobs.opm.gov/. You must apply online in order to be considered for this position.

The annual salary range is $111,694 to $145, 201. The position is located in Lakewood, Colorado, a suburb of Denver. For more information contact Georgia Lahr at 303-236-9572 or glahr@usgs.gov.

You must be a U.S. citizen. The U.S. Geological Survey is an equal opportunity employer.

STUDENT OPPORTUNITIES

Announcement of Two PhD Positions in Seismology Available at the Institute of Geophyiscs, ETH Zurich, Switzerland. The Geophysics Institute at ETH-Zurich (http://www.seg.ethz.ch/) invites applications for two Ph.D. student positions in seismology and geodynamics. The successful candidates will study regional-scale seismic tomography, including its implications for geodynamics, applied to Europe and the mediterranean basin. This research project emphasizes application of innovative techniques in seismology, including finite-frequency ("banana-doughnut") tomography, and interferometric analysis of seismic ambient noise. Advisors will be Prof. Eduard Kissling and Dr. Lapo Boschi, in collaboration with Dr. Alberto Michelini (INGV Roma, Italy).

Complete applications must include statement of personal interests, curriculum vitae and names and addresses of two references, and should be sent to Dr. L. Boschi (paper form accepted, electronic form preferred). We will start reviewing applications at the end of August, and plan to interview candidates before the end of October, 2007.

Education requirements:

Completion of undergraduate studies in physical/mathematical sciences, computer sciences, or earth sciences.

ETH is an equal-opportunity and nondiscriminating employer.

Contact address:
Dr. Lapo Boschi
Institut fuer Geophysik
ETH Hoenggerberg (HPP)
CH-8093 Zurich
Switzerland
Email: larryboschi@gmail.com

PhD Student Scholarship in Atmospheric Science. The Atmospheric Research Group, Department of Physics, National University of Ireland, Galway has a vacancy for a PhD student in the field of atmospheric science. The successful candidate will study the effect of ambient relative humidity on aerosol radiative parameters: aerosol light scattering coefficient and aerosol absorption coefficient. The work involves laboratory work, as well as field work at the Mace Head Atmospheric Research Station [http://macehead.nuigalway.ie] on the west coast of Ireland. Cooperative work with the Laboratory of Atmospheric Chemistry at the Paul Scherrer Institute, Villigen, Switzerland is also planned. Applicants should hold a good honours degree [grade 2.1 at least] in physics or in a cognate subject. Funding covers at least a 3-year stipend and also covers tuition fees.

For informal enquiries, please contact the project leader Professor S.G. Jennings, Tel: +353-91-492704; fax +353-91-495515 or via e-mail; gerard.jennings@nuigalway.ie.

Applicants are requested to submit a covering letter, CV and the names of at least two referees via e-mail to: gerard.jennings@nuigalway.ie.

The position will remain open until filled.

PhD studentship at the Vrije Universiteit Amsterdam. Optimising sampling strategy for a Combined Raman Spectrometer /Laser Induced Breakdown Spectrometer designed for the Exo-Mars mission.

The Faculty of Earth and Life Sciences of the Vrije Universiteit (VU), Amsterdam, in collaboration with TNO-Space, has a vacancy for a 4-year PhD position to evaluate the optimal operating conditions of a combined laser Raman-laser induced breakdown spectrometer (RLS) Elegant Breadboard (EBB). The RLS will form a key component of ExoMars, the flagship mission of the Aurora programme of the European Space Agency (ESA). The goal of the PhD project is to evaluate the performance of the RLS in a Martian analogue environment in order to develop an operational and sampling strategy for the RLS on Mars. The project represents part of an ongoing development and manufacturing project that is carried out in conjunction with colleagues from Spain, France, Germany and the UK. For further information about the host institution see www.falw.vu.nl/petrology.

We are seeking an enthusiastic and highly motivated candidate with a good analytical background, preferably with experience in spectroscopy/laser ablation/mass spectrometry. An MSc or equivalent in analytical chemistry, physics or Earth Sciences is a prerequisite for the position. After a satisfactory evaluation of the initial appointment it will be extended by 3 years. For a review of working conditions for PhD students in The Netherlands visit http://www.eracareers.nl. Closing date for application August 24th.

Postgraduate Scholarship Opportunities at the School of Environmental Systems Engineering, The University of Western Australia. The school of Environmental Systems Engineering of The University of Western Australia invites application for the next scholarship round. A range of Scholarships are available to outstanding candidates who have completed at least an undergraduate degree in engineering, science or equivalent, but preferably a Masters by research in relevant disciplines of science or engineering. The school offers a unique opportunity for students to conduct multidisciplinary research activities leading to the degree of Masters or PhD. Students have access to world class facilities and instrumentation to conduct research on process understanding of natural aquatic systems including catchments, groundwater basins, wetlands, rivers, lakes, estuaries and regional seas. The University of Western Australia is located in the beautiful city of Perth, home to some of Australia's most magnificent coastlines. Closing date for applications is August 15th, 2007. For more information please send an expression of interest along with a detailed CV to Dr. Anas Ghadouani at eos2007@sese.uwa.edu.au. Additional information can be found at www.sese.uwa.edu.au.

UCLA Ion Microprobe Student Workshop (Nov. 12-16, 2007). The W.M. Keck Foundation Center for Isotope Geochemistry at UCLA invites interested graduate or prospective graduate students to attend a five day workshop for research training in ion microprobe applications. We seek motivated applicants involved in geochemical, geochronologic, cosmochemical, biogeochemical, or environmental research that can benefit from the relatively non-destructive capability of ion microprobes to obtain high spatial resolution elemental and radiogenic/stable isotopic compositions from solid materials. The workshop will occur within UCLA's National Facility for SIMS (secondary ionization mass spectrometry) research (http://sims.ess.ucla.edu/) which features a high-resolution, high sensitivity CAMECA ims 1270. SIMS theory and hands on instruction will be provided by UCLA faculty and researchers associated with the facility. NSF's Instrumentation and Facilities program will sponsor travel, accommodation costs, and course materials. Please submit applications via: http://sims.ess.ucla.edu/SIMSWORKSHOP2007.html. Successful applicants will be notified by 9/15/07.

SERVICES, SUPPLIES, COURSES, & ANNOUNCEMENTS

United States Polar Rock Repository. Polar rock samples available for research, teaching and museum use. Visit: http://www-bprc.mps.ohio-state.edu/emuwebusprr; Email: curator@bprc.mps.ohio-state.edu

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Post Doctorate Position in Electromagnetic & Seismic Inverse Modeling

Lawrence Berkeley National Laboratory (LBNL) is located in the San Francisco Bay Area on a 200-acre site in the hills above the University of California's Berkeley campus and is managed by the University. A leader in science and engineering research for more than 75 years, Berkeley Lab is the oldest of the U.S. Department of Energy's National Laboratories.

The Earth Sciences Division at Lawrence Berkeley National Laboratory is seeking a qualified candidate to work on large-scale, three-dimensional, geophysical inverse problems involving electromagnetic and seismic data sets. The position requires numerical skills in inverse theory and large-scale optimization, techniques for solving boundary value problems for EM and seismic wave propagation, knowledge of Maxwell's equations, and elastic and acoustic seismology. Also essential are programming skills for distributed/parallel computing environments. Though not required for this position, geophysical data processing and computer graphic skills would be valued.

The candidate accepting this position will be expected to publish and present findings at technical meetings, and work with both government and industrial sponsors. Excellent communication and written skills are essential, in addition to a willingness to work in a collaborative team environment with project scientists. The position is for one year and renewable for up to three years.

Please apply at **http://cjo.lbl.gov**, select "Search Jobs" and enter 20822 in the keyword search. Select the "Upload Your Resume" option, and follow the online instructions to complete the application process. Interested candidates should submit a detailed curriculum vitae, statement of interest in the position, and list of at least three references as one Word document. Enter "Eos" as your source. Berkeley Lab is an affirmative action/equal opportunity employer committed to the development of a diverse workforce. **www.lbl.gov**

Questions about the job should be addressed to:
Gregory Newman (email: ganewman@lbl.gov)
Earth Sciences Division, MS-90-0116
Lawrence Berkeley National Laboratory • One Cyclotron Road • Berkeley, CA 94720

ASU SCHOOL OF EARTH & SPACE EXPLORATION
ARIZONA STATE UNIVERSITY

SESE

The School of Earth and Space Exploration at Arizona State University seeks a
Media and Public Relations Coordinator

The selected candidate will, under limited supervision, publicize the research and educational activities of the School of Earth and Space Exploration to a diverse audience including the scientific establishment, media outlets, individual donors, philanthropic organizations, potential graduate students, K-12 students and the general public.

Duties and responsibilities include:

- Design and implement a variety of public relations activities for a wide range of venues
- Create promotional content for development documents, web pages, and other digital media
- Develop and maintain the School web site
- Write and distribute news releases on School activities
- Produce a periodic School newsletter for friends and alumni
- Ensure a well-orchestrated publicity strategy for the School in coordination with CLAS/ASU development officers and media relations specialists
- Field questions regarding the School's research and education
- Coordinate School outreach programs that are conducted by staff from the Geology Museum, Planetarium, Center for Meteorite Studies, Lunar Reconnaissance Orbiter Center, and Mars Space Flight Facility
- Work with School's graphics designer to develop print and promotional material
- Collaborate with CLAS Office of Media Relations
- Other projects as assigned by Director

Minimum Qualifications: Bachelor's degree in a field appropriate to the area of assignment and five years of related experience; OR, Any equivalent combination of education and/or experience from which comparable knowledge, skills and abilities have been achieved.

Desired Qualifications:

- Master's degree in a field appropriate to the area of assignment
- Prefer an applicant with some background in or familiarity with earth sciences and/or planetary sciences
- Effective verbal and written communication skills
- Evidence of effective organizational skills
- Experience using web-based technologies

General Information: The School of Earth and Space Exploration (SESE) is a new School within the College of Liberal Arts and Sciences (CLAS). SESE integrates Earth Sciences, Planetary Science, Astrophysics and Engineering into a unique, transdisciplinary program of study. It is the first of its kind. This position reports to the Director of the School and offers an opportunity to work with a diverse group of people and tasks in an exciting, new environment on campus.

Salary: Depends on experience and qualifications

Instructions to apply: Applications must be submitted on-line. Visit ASU's website http://www.asu.edu/asujobs/, **Job ID# 11808.**

Application deadline is 11:59 p.m. (Arizona time) **August 12, 2007**. Complete required information and attach cover letter, resume, and names, addresses and phone numbers of three professional references. REQUESTED MATERIAL MUST BE IN ONE ATTACHMENT. If you need assistance applying for this job, please contact our customer service center at 480-965-2701.

Also, please provide an illustrative portfolio of your work. This should be mailed to:

Arizona State University
School of Earth and Space Exploration
PO Box 871404
Tempe, AZ 85287-1404
Attn: Corey Polka

Other information: ASU does not pay candidates for travel expenses associated with interviewing, unless otherwise indicated by the department at the time of call for interview.

ASU conducts pre-employment screening for all positions which includes a criminal background check, verification of work history, academic credentials, licenses, and certifications.

ASU is an Equal Opportunity/Affirmative Action employer.

ICP-MS-Laboratory Manager

We are looking for a highly motivated, skilled and experienced specialist in inductively coupled plasma mass spectrometry (ICP-MS) who would like to join a dynamic, multi-user ICP-MS group as a laboratory manager at the Woods Hole Oceanographic Institution (WHOI).

Our laboratory is equipped with a ThermoFinnigan Neptune multi-collector ICP-MS, two Element2 single-collector ICP-MS, two New Wave 213 nm laser ablation systems and ancillary sample preparation equipment. The position requires a solid understanding of ICP-MS and laser technology, an aptitude towards mass spectrometer hardware including electronics, combined with the interpersonal skills to interact with a diverse user base and to lead the laboratory staff.

Research conducted in the ICP-MS laboratory encompasses the entire periodic table in areas ranging from the mantle dynamics, ocean and continental crust evolution, paleoclimatology, paleoceanography, chemical oceanography, marine biology, to environmental pollution. Regular users of the laboratory include scientists from the Departments of Geology & Geophysics, Marine Chemistry & Geochemistry, and Biology. The wide range of projects offers unique opportunities for developing new analytical protocols and conducting cutting-edge research. The ICP-MS laboratory also plays an important role in the MIT/WHOI Joint Graduate Program in Oceanography and other Academic Programs involving students and postdoctoral scholars with various levels of ICP-MS experience. Education and experience will determine level of hire (Research Associate III or Research Specialist).

WHOI is a research and educational Institution located in the seaside village of Woods Hole on scenic Cape Cod, 80 miles south of Boston. Details can be found at www.whoi.edu. The ICP-MS laboratory website www.whoi.edu/science/MCG/plasma-facility/ provides further information on the laboratory and its operation.

A CV, statement of technical, research and management interests and accomplishments (up to 4 pages), a list of 3-4 published papers or other examples of work that we may include in your review file, and the names and addresses of at least six references should be submitted to WHOI, via the online application program at:

http://jobs.whoi.edu/

Women and Minorities are encouraged to apply.
M/F/D/V/EOE

Information Systems Associate I or II

We are seeking a scientific programmer skilled in the manipulation of satellite data and numerical model output. The successful candidate will also have occasional system administration duties on hardware ranging from small Linux servers to large parallel processing Linux systems. The successful applicant will have skills that include appreciable knowledge of FORTRAN, C, and other third generation programming languages as well as skill in numerical analysis. The successful candidate must also have extensive knowledge of MatLab and other fourth generation computer languages.

Education and experience will determine level of hire.

For a full job description visit us at **http://jobs.whoi.edu** and if qualified, please apply.

Women and Minorities are encouraged to apply.
M/F/D/V/EOE