

EarthScope National Office
School of Earth and Space Exploration
Arizona State University
PO Box 876004
Tempe, AZ 85287-6004
<http://www.earthscope.org>

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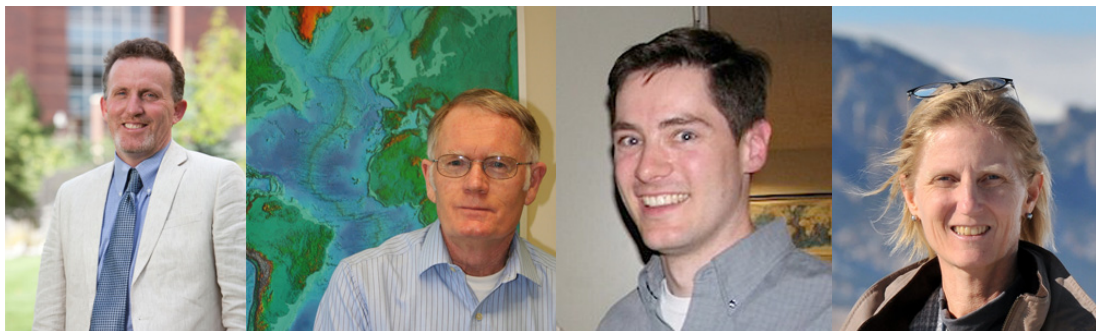


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EarthScope Speaker Series 2012-2013

The EarthScope National Office officially announces the EarthScope Speaker Series for 2012-2013, supported by the National Science Foundation. The five exemplary speakers for this new series are: Robert Butler (University of Portland), Graham Kent (University of Nevada, Reno), Kristine Larson (University of Colorado, Boulder), Matt Pritchard (Cornell University). Academic institutions are invited to apply for a Speaker visit for the 2012-2013 academic year. Complete information about the EarthScope Speaker Series, including speaker biographies and an online application form, can be found on the EarthScope website at www.earthscope.org/speakers. The application deadline for a Speaker visit in 2012-2013 is **August 15, 2012**. Questions about the Speaker Series can be directed to earthscope@asu.edu.



Above Left to Right, *Graham Kent, Robert Butler, Matt Pritchard, and Kristine Larson*

summer 2012

EarthScope News

EarthScope National Meeting Save the Date

We are excited to announce that the 2013 EarthScope National Meeting will be held in Raleigh, North Carolina from May 13-15, 2013. Details will be forthcoming as they are developed, but we wanted to ensure that you mark your calendars now for what promises to be an excellent and exciting meeting!

Please don't hesitate to contact us about either the meeting or EarthScope in general.

EarthScope National Office
earthscope@asu.edu

US Science and Engineering Festival

EarthScope and UNAVCO participated in the USSEF March 27-29 in Washington, D.C. Earth Science education was presented to people of all ages.

For Festival video please visit www.youtube.com/user/EarthScopeInfo

EarthScope and Place-Based Education

When we affix meaning to any physical locality—by naming it, building a home there, exploring its geology and geophysics as EarthScope research does—we make it a *place*. Place-making is in human nature, and people are naturally interested in places, often forming intellectual and emotional ties (the "sense of place") to places that are particularly meaningful to them. The place-based approach to teaching, a central theme of EarthScope Education and Outreach, leverages the senses of place of students and educators by focusing curriculum (subject matter and experiential learning) in local and regional landscapes and communities. Although the specific term "place-based education" has only been in wide use since the late 1990s, place-based teaching philosophy and methods can be traced directly back more than a century to the early practices of civics and experiential education, and subsequently through environmental and outdoor teaching and learning. Given that traditional ways of teaching practiced by indigenous groups such as Native Americans have always been strongly place-based, the provenance of the approach on the North American continent actually dates back many millennia.

Place-based teaching encourages trans-disciplinary thinking, and is intended to foster environmental and cultural sustainability of the places and regions under study. In the context of Earth science education, a place-based approach engages students with Earth features, processes, and history that can be observed in their surroundings; draws connections between geoscience and local resources, hazards, and environmental issues (such as water and air quality); and prepares them for subsequent studies of the Earth system at global scales. Because places are defined culturally as well as physiographically, authentic place-based Earth science teaching draws useful examples and case studies from other locally relevant disciplines such as ecology, anthropology, history, and economics; and integrates humanistic and artistic interpretations of places such as landscape photography and painting, nature writing, and cinema; all to provide richer context and relevance for geoscientific inquiry into places.

Today, place-based education is advocated by educators for its capacity to better engage and retain the interest of introductory science students and other potential majors, especially those who have personal, cultural, or community ties to the places under study. Research has shown that the use of place as an organizing theme for curriculum at different grade levels can measurably enhance students' content knowledge, sense of place, and community engagement. The U.S. Department of Education has recently adopted a place-based strategy nationwide for measuring and enhancing the effectiveness of its programs: it now focuses on real places, rather than individual funding programs, as its basic units of analysis (see *Impact in Place: A Progress Report on the Department of Education's Place-Based Strategy*, June 2012). It is important to reiterate that a place-based approach to Earth science is not intended to supplant the global perspective essential to Earth system science literacy, but is an accessible and relevant introduction to scientific inquiry and systems thinking that can be directly applied in ever-broadening contexts. The July 2011 issue of *In the Trenches*, the newsmagazine of the National Association of Geoscience Teachers (NAGT.org), offers descriptive articles and specific examples of place-based geoscience curricula that can be adapted to other places.



Although all places and regions of the United States have rich and interesting histories of tectonism, mountain-building, volcanism, sedimentary deposition, and erosion encoded in the rocks of their subsurface, many such regions have low relief and limited outcrop that challenge place-based Earth science teaching focused on local crustal structure and evolution. Enter EarthScope!

Continued on next page



EarthScope and Place-Based Education continued from front page

As USArray, the Plate Boundary Observatory, and affiliated geophysical and geological campaigns migrate eastward from coast to coast (and later to Alaska), these EarthScope programs are revealing unprecedented detail about crustal and mantle structure that can bring local geologic stories to life for teachers and students. In addition to an existing catalog of long-standing examples of exciting connections between local geology and Earth's deeper interior, such as Cascadia, the Sierra Nevada, and Yellowstone, a multitude of new EarthScope-enabled findings add to that library. Examples include, but are certainly not limited to, new results inferring mantle downwellings beneath the edge of the Colorado Plateau and the Great Basin, removal of lithosphere along the western edge of the North American Craton, broadly distributed deformation along the Rio Grande Rift, and detection of intense microseismicity in Arizona and Oklahoma. Geodetic data provide information on the dynamics of the Earth system across North America in real time, from plate motion to climate.

The next year promises to greatly expand this list, as unique new data are collected from many other areas, including the Mid-Continent Rift and suture zones in the southeastern U.S. Research publications based on EarthScope science can be located by means of a bibliography on the EarthScope webpage (<http://www.earthscope.org/publications/2012>). This bibliography is being expanded and updated by the EarthScope National Office.

In collaboration with GeoPRISMS, EarthScope has also organized regionally focused scientific planning workshops for Cascadia (Pacific Northwest) and Eastern North America. The reports issued from these workshops (www.geoprisms.org/past-meetings) show how EarthScope research will be focused regionally and locally to uncover continental structure and dynamics.

EarthScope researchers and educators are also offering regional and local programs in education and outreach designed to share locally relevant geoscientific findings with formal educators (K-12 and college teachers) and informal educators (park and museum educators and interpreters), who are in turn using EarthScope science to enhance their own place-based activities. Some examples of these programs are Teachers on the Leading Edge or TOTLE (orgs.up.edu/totle), Illinois EarthScope (www.isgs.illinois.edu/education/EarthS.shtml), and the Earth Science Interpretive Workshop series presented semi-annually by the EarthScope National Office (www.earthscope.org/eno/parks). EarthScope staff are also in attendance at the annual meetings of the National Science Teachers Association, Geological Society of America, and American Geophysical Union where we meet with educators and scientists and share information about EarthScope and place-based education.

EarthScope researchers, while encompassing the broader impacts of their research, are encouraged to consider how their scientific findings, interpretations, and products (such as diagrams and maps) can be disseminated in a way that fosters the place-based teaching of Earth science situated in the regions and places they are studying. The EarthScope National Office (earthscope@asu.edu) stands ready to assist in this effort at any time.

Earth science educators, formal and informal, are encouraged to follow EarthScope through its website (www.earthscope.org), Facebook page (www.facebook.com/EarthScope), Twitter feed (@EarthScopeInfo), Google Plus page (EarthScope Information) and YouTube channel (www.youtube.com/user/EarthScopeInfo), to learn about findings and useful teaching resources as they emerge.

By Steven Semken, ESNO Deputy Director for Education and Outreach

Above right, Seth Stein discussing the North American Midcontinent Rift, near the St. Croix River, Minnesota



SAFOD Request for Proposals

The National Science Foundation is pleased to announce the release of the solicitation for proposals for a new San Andreas Fault Observatory at Depth (SAFOD) Management Office (SMO). The SMO will be responsible for overseeing the SAFOD component of the EarthScope Facility in cooperation with NSF and our partners at the US Geological Survey.

The solicitation is available from http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=504812&org=EAR&from=home, and proposals will be due on 24 September 2012. Please contact Greg Anderson at NSF (greander@nsf.gov or 703.292.4693) with any questions.

San Andreas Fault Observatory at Depth (SAFOD) directly reveals the physical and chemical processes controlling earthquake generation within a seismically active fault.

EarthScope and GeoPRISMS Complimentary Research and Joint Planning

A balance between EarthScope-centric data gathering, science, and the interests and capabilities of other complementary communities is valuable. GeoPRISMS' amphibious investigations of Geodynamic Processes at Rifting and Subduction Margins (<http://www.geoprisms.org>) is a strong complement to EarthScope observational and scientific targets. In the last year, GeoPrisms and EarthScope held three joint workshops:

- GeoPRISMS - EarthScope Planning Workshop for the Alaska Primary Site Portland, OR, September 22-24, 2011 (<http://www.geoprisms.org/component/content/article/175.html>)
- EarthScope - GeoPRISMS Science Workshop for Eastern North America Bethlehem, Pennsylvania; October 27-29, 2011 (<http://www.geoprisms.org/past-meetings/enam-oct2011/191.html>)
- GeoPRISMS - EarthScope Planning Workshop for the Cascadia Primary Site Portland, OR April 5-6, 2012 (<http://www.geoprisms.org/past-meetings/207-cascadia-apr2012.html>)



These meetings were attended by many EarthScope scientists. Significant informal and formal consideration of science targets as well as facilities' planning and management was discussed. The conveners from each of the workshops produced workshop reports full of reviews of the latest scientific results, major research questions, related activities, and opportunities for leveraged efforts with EarthScope (see links above). The workshop reports were distilled into GeoPrisms implementation plans (<http://www.geoprisms.org/science-plan.html#implementation-plan>) which will guide NSF proposal preparation and review. Proponents have begun writing joint EarthScope-GeoPRISMS proposals to the National Science Foundation to pursue joint research at a level and with a perspective difficult for GeoPRISMS or EarthScope activities to accomplish alone.

By Ramon Arrowsmith, ESNO Director

Above, enthusiastic participants at the GeoPRISMS - EarthScope Planning Workshop for the Cascadia Primary Site.

EarthScope Interpretive Workshop - Central Appalachian Region

Hosted by James Madison University (JMU) and organized by ESNO, this workshop featured presentations and collaborations by EarthScope geoscientists and interpretive professionals to better present the geological stories of the Central Appalachian Region to the public, teachers, and students. Workshop participants learned about the EarthScope program and the geological evolution of the Appalachians, learned how to use basic geological information and scientific results from EarthScope and other sources, and developed and presented actual interpretive programs. The workshop also included a geological field trip to the Valley and Ridge to Blue Ridge Province Transition, and a presentation at JMU by EarthScope Speaker Meghan Miller.

For more information please visit <http://www.earthscope.org/workshops/appalachians>

Photo right, courtesy of Wendy Taylor



Special Issue of Earth & Planetary Science Letters (EPSL): USArray

EPSL is seeking papers on instrumentation, background noise studies, seismicity and earthquake source studies, wave propagation investigations, new seismic analysis methods, and interpretation of earth structure and dynamics using USArray Transportable and/or Flexible Array data.

The papers will be published online in EPSL's Article in Press section. Deadline for submission is January 9, 2013 for publication consideration.

For more information, please visit <http://cybershare.utep.edu/announcements/2012/earth-planetary-science-l>