

EAR TO THE GROUND

Summer 2014

The Division of Earth Sciences (EAR) is part of the Geosciences (GEO) Directorate at the National Science Foundation.

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Spreading Ridge in Iceland 30 meters
Image Credit: Dr. Jennifer Wade

Update from Acting Division Director

Sonia Esperança



Paul Cutler has done a wonderful job of leading EAR through the first few months of this transitional period, while we continue our search for the next EAR Division Director. The decision to continue rotating some of the program officers in this position was made following discussions between EAR staff and the GEO Front Office. I am excited to continue Paul's good work and to take a turn in EAR's management. For those who have not met me previously, I have been at NSF for approximately 15 years, mostly working as one of two Program Officers for the Petrology and Geochemistry program. In 2010, I spent a year 'on loan' to the Division of Polar Programs, where I had the opportunity to be a program officer for some very challenging but exciting large projects in the Antarctic Integrated System Sciences program. During my tenure at NSF, I participated in a

number of Crosscutting programs and working groups. By far the most challenging but equally rewarding assignment was to Chair NSF's CAREER program for four years (2008-2012). We hope you will continue to give us your support and encouragement during this period of shared governance in EAR, and we look forward to successful completion of the ongoing Division Director search process.

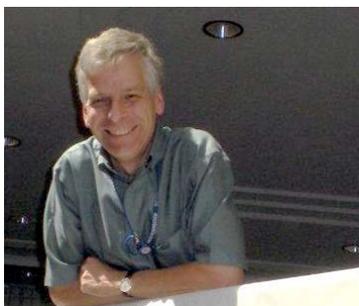
I would also like to thank Jessica Robin for her significant contribution to EAR, where she served as one of the Program Directors, for the Geomorphology and Land Use Dynamics (GLD) program. Jessica is returning to the Office of International and Integrative Activities (OIIA), where she was sorely missed. It will be our turn to miss her as Jessica was a great asset to the EAR staff. We wish her the very best. On the positive side, we are welcoming back Dr. Richard Yuretich. Richard served as a GLD program director in years past and we are very excited to have him back for a while. After a long search, we have filled the position of Section Head for the Surface Processes Section. Dr. Alexandra Isern comes to us from the Division of Polar Programs and we are truly fortunate that she agreed to join EAR.

EAR Welcomes New Section Head Dr. Alexandra "Alex" Isern



Dr. Alexandra "Alex" Isern joined EAR as the new Section Head for Surface Earth Processes. Alex completed her PhD in geochemistry at the Swiss Federal Institute of Technology in Zurich. After her PhD, Dr. Isern was a Lecturer in Marine Science and Geology at the University of Sydney, Australia for six years before moving back to the U.S. Her research primarily focused on the evolution of carbonate platforms and reefs as a result of climate change and resulted in many months at sea and in the field. Alex has worked in multiple groups during her thirteen years at NSF. She was the Program Director for the Ocean Observatories Initiative as well as the Ocean Technology and Coastal Ocean Processes Programs within the Division of Ocean Science. More recently she worked in logistics and research support for the U.S. Antarctic Program and was Program Director for Antarctic Earth Sciences in the Division of Polar Programs. She is looking forward to working with the varied research communities supported by the Surface Earth Processes Section!

EAR Welcomes New Program Director Dr. Richard Yuretich



Richard Yuretich has assumed the position of Program Director for Geomorphology & Land-use Dynamics as of this past February. This is a return engagement for him, since he occupied this position as a rotator from 2008 to 2010. Richard has been a Professor in the Department of Geosciences at the University of Massachusetts Amherst since 1980 and is the Co-Director of the Environmental Science Program. He received his PhD from Princeton

Student Spotlight



Do you have a student involved in your ongoing EAR-funded project that is making an innovative contribution to the research and/or broader impacts? Nominate them to be featured in our new Student Spotlight section! Submit a photo & description (100-word max) of their contribution to the project. Students at the high school, undergraduate, or graduate level are eligible for nomination for the new section. We ask that the submissions come from PIs as a recommendation for the feature rather than the students themselves.

Submit nominations to rthornto@nsf.gov with the subject line: "Student Spotlight". Upon selection, photo release forms will be required. Keep checking EAR to the Ground to read about some up and coming young scientists and nominate your student!

University and has been involved in research projects that span the breadth of Surface Earth Processes including tectonics and sedimentation in rift valleys, paleoenvironmental studies of lake environments, weathering mechanisms, and environmental issues related to water chemistry. He brings to GLD experience in interdisciplinary collaborations among the sciences and other fields. At UMass Amherst he received the Outstanding Teaching Award and the Outstanding Service/Outreach Award from the College of Natural Sciences. He looks forward to re-connecting with the EAR community and promoting exciting research and educational programs in the Earth Sciences.

**The Institute for Broadening Participation:
Pathways to Science** *Justin Lawrence*



Broadening participation of underrepresented groups is an important category of broader impacts at the National Science Foundation (NSF). There are ways of broadening participation that are more successful than others, and it is helpful to consult reputable sources when making your plans. The Pathways to Science project of the Institute for Broadening Participation (IBP) is a quality resource, which includes specialized information for the Earth Science disciplines that can be accessed on their [website](#) by searching programs by field of study. There you can find information on undergraduate summer research positions, graduate fellowships, and postdoctoral opportunities and resources and materials relevant to recruitment, retention, and mentorship.

We recommend several items on the Pathways to Science website that should be of particular value to the PI community in Earth Sciences. The first is the [General Faculty Resources](#) in the Resource Toolkit, which include an overview of the available resources,

positive factors that the research indicates enable students to persevere and be successful in STEM fields, and some tips on using social media. The other two are handouts on broadening participation in programs, entitled "[Growing the Diversity Awareness & Cultural Competency of Faculty and Partners](#)" and "[Outreach: Recruitment and Retention](#)".

Successful research projects in the Earth Sciences Division broaden participation of underrepresented groups in different ways and any given project should not try to do everything. It is always better to have a clear, well defined plan that is fit to the scope of the project. However, one common theme is that strong projects promote full participation of women, persons with disabilities, and other underrepresented minorities in STEM, such as Hispanics, African Americans, Native Americans, Pacific Islanders, Alaskan Natives, and Native Hawaiians. Partnering with Hispanic Serving Institutions (HSI), Historically Black Colleges and Universities (HBCUs), Tribal Colleges and Universities (TCUs), other Minority Serving Institutions (MSIs), community colleges, or two-year colleges is encouraged.

Transition Plans for the SAFOD Component of EarthScope

Greg Anderson

The San Andreas Fault Observatory at Depth (SAFOD) component of the EarthScope Program was intended to enable multidisciplinary research into the physical and chemical processes that govern the behavior of large plate-bounding faults. SAFOD was designed to do so through (1) collection of seismic and other data from a long-term observatory installed inside a deep borehole drilled through the San Andreas Fault near Parkfield, California and (2) collection, curation, and distribution of physical samples from the borehole. The physical samples collected during SAFOD construction are a clear success, with research groups worldwide using over 500 samples for a variety of investigations resulting in dozens of publications in just the past few years. However, despite significant effort, the downhole component has not been as successful.

Since 2009, NSF has consulted with multiple advisory groups, an independent SAFOD engineering review committee, and PIs through numerous stages of review and advice about the future of SAFOD. There is clear community desire for continued access to SAFOD physical samples for a variety of studies. The downhole aspects of SAFOD are less certain, but there is consensus that achieving most of the remaining scientific value of SAFOD downhole activities would require continuous data from a new observatory, and that such an observatory would require significant new investments and involve substantial risk.

NSF therefore intends to transition to a new support model for SAFOD activities:

1. NSF intends to continue support for research and education activities using SAFOD physical samples. Texas A&M University has now assumed stewardship of these materials, under an award that is planned to operate through FY 2016 with Professor Judith Chester as PI.
2. NSF does not intend to set aside any specific level of funding for proposals involving SAFOD downhole activities.
3. NSF does not intend to solicit proposals either for PI-driven experiments using the SAFOD Main Hole or for a new entity to assume management of SAFOD downhole activities.
4. NSF will process, through the normal merit review system, any unsolicited proposals received for use of the Main Hole or for management of SAFOD downhole activities.
5. If no such proposals are received within six months, NSF intends to explore further options for SAFOD downhole activities, including alternative ownership arrangements for the Main Hole or transitioning it into a long-term "mothball" status.

We have released a [Dear Colleague Letter \(NSF 14-058\)](#) that provides more details. You can also contact Greg Anderson with questions or comments at mgreander@nsf.gov or 703.292.4693.

Updated GeoPRISMS Solicitation

Jennifer Wade

Two updates have been made to the GeoPRISMS solicitation: 1) The deadline for 2014 will be August 1 (it goes back to July 1 in 2015); 2) We have added some details regarding coordinated work in the [Alaska/Aleutian Primary Site](#), as we hope to arrange logistical support for up to two seasons of community field projects, in the form of ship and helicopter support in the Aleutians. Pending proposal success, availability of funds and vessel scheduling, up to 30 days could be available in each of the 2015 and 2016 summer field seasons. This coordination of field logistics at the Alaska Primary Site should maximize the science return for the available funds. Proposals involving field work in the Aleutians should include, as they normally would, personnel budgeting for travel to/from AK, personnel costs during field work, and a timeline for the work. However, we expect to negotiate, at the award stage, final budgets and work plans so that we may best take advantage of the shared field platforms supported by the program. Questions about this particular effort should be directed to Program Officer Jennifer Wade: jwade@nsf.gov; 703.292.4739.

These updates are all part of the new solicitation [NSF 14-556](#).

Instrumentation & Facilities: [IRIS](#)

Under a new award that started in October 2013, the seismological facilities previously operated by the IRIS Consortium under two Cooperative Agreements with NSF have been merged into one award entitled *Seismological Facilities for the Advancement of Geosciences and EarthScope* (SAGE). The long standing IRIS "core" programs,

including the Global Seismographic Network, Portable Arrays for Seismological Studies of the Continental Lithosphere (PASSCAL), Data Services and Education and Public Outreach (EPO) are now combined with the activities of the Transportable Array, Flexible Array and Magnetotelluric (MT) that were previously supported through the EarthScope award for USArray.

The USArray Transportable Array has now completed its decade long trek across the lower 48 and is transitioning to the installation of stations in Alaska. The 1698 sites that have been occupied in the conterminous US (Figure 1) are providing a rich resource of data for studies of the structure of the continental lithosphere as well as probing the deep Earth and unraveling the complexities of major earthquakes worldwide (Figure 2). The image of shallow lithospheric structure (from 5 s Raleigh waves) provided by Göran Ekström (Figure 3) shows interesting features extending all the way to the east coast in

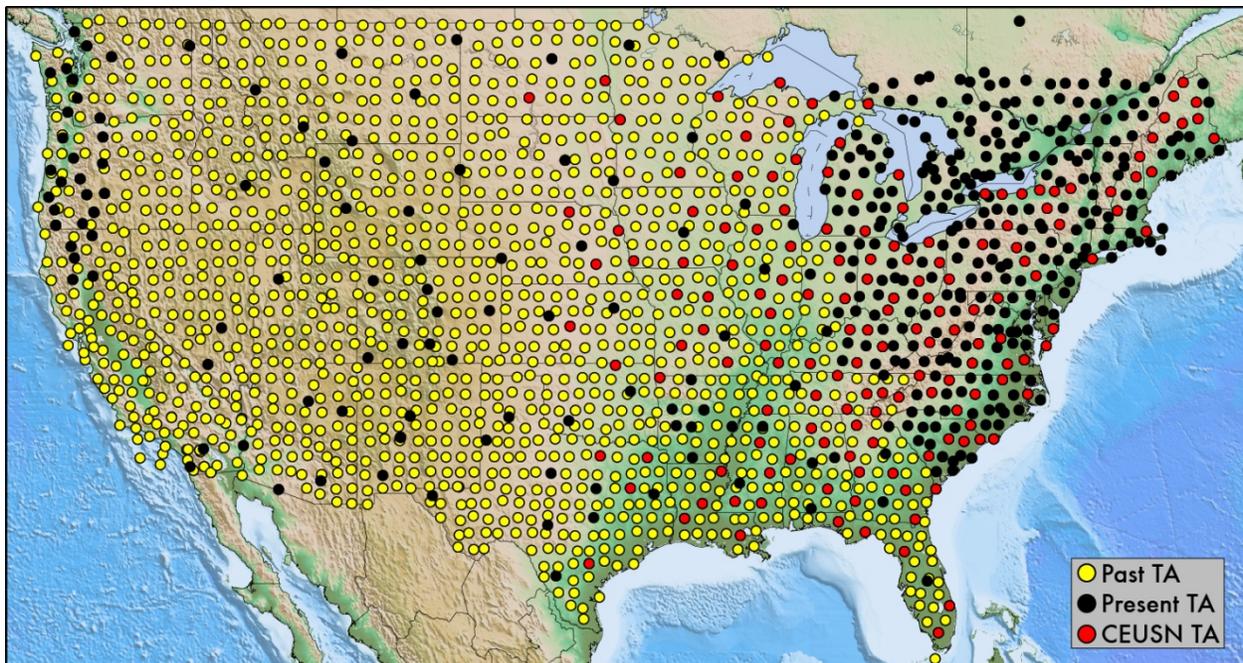


Figure 1: Map of USArray Transportable Array station locations in the lower 48. Red indicates stations that will become part of the CEUSN. Black are other stations of the TA that are currently operating, including "adopted" stations that will continue to operate in the west and part of the Cascadia Amphibious Array.

this synoptic view of the continent. Through a coordinated effort between NSF, USGS, NRC and IRIS, a significant legacy of EarthScope in the central and eastern parts of the US will be the creation of a Central and Eastern US Network (CEUSN). Within the TA footprint established over the past four years, approximately 160 stations (shown in red in Figure 1) have been selected to remain as permanent observatories. These are being converted to CEUSN standard (with higher frequency accelerometers) and will continue to operate through 2018. It is anticipated that the USGS will take responsibility for the support of these stations long-term by the end of the current SAGE award in 2018. These stations greatly expand the coverage in this part of the US and provide an

important new resource for monitoring low-level seismicity (of special interest because of recent cases of induced seismicity) and for improvements in the characterization of attenuation (of significance in the assessment of seismic risk to critical facilities).

As the Transportable Array begins its operations in Alaska, it is presented with new challenges across all aspects of network operation, compared to the experience in the lower 48. Much of the first year of Alaskan activities are being dedicated to establishing

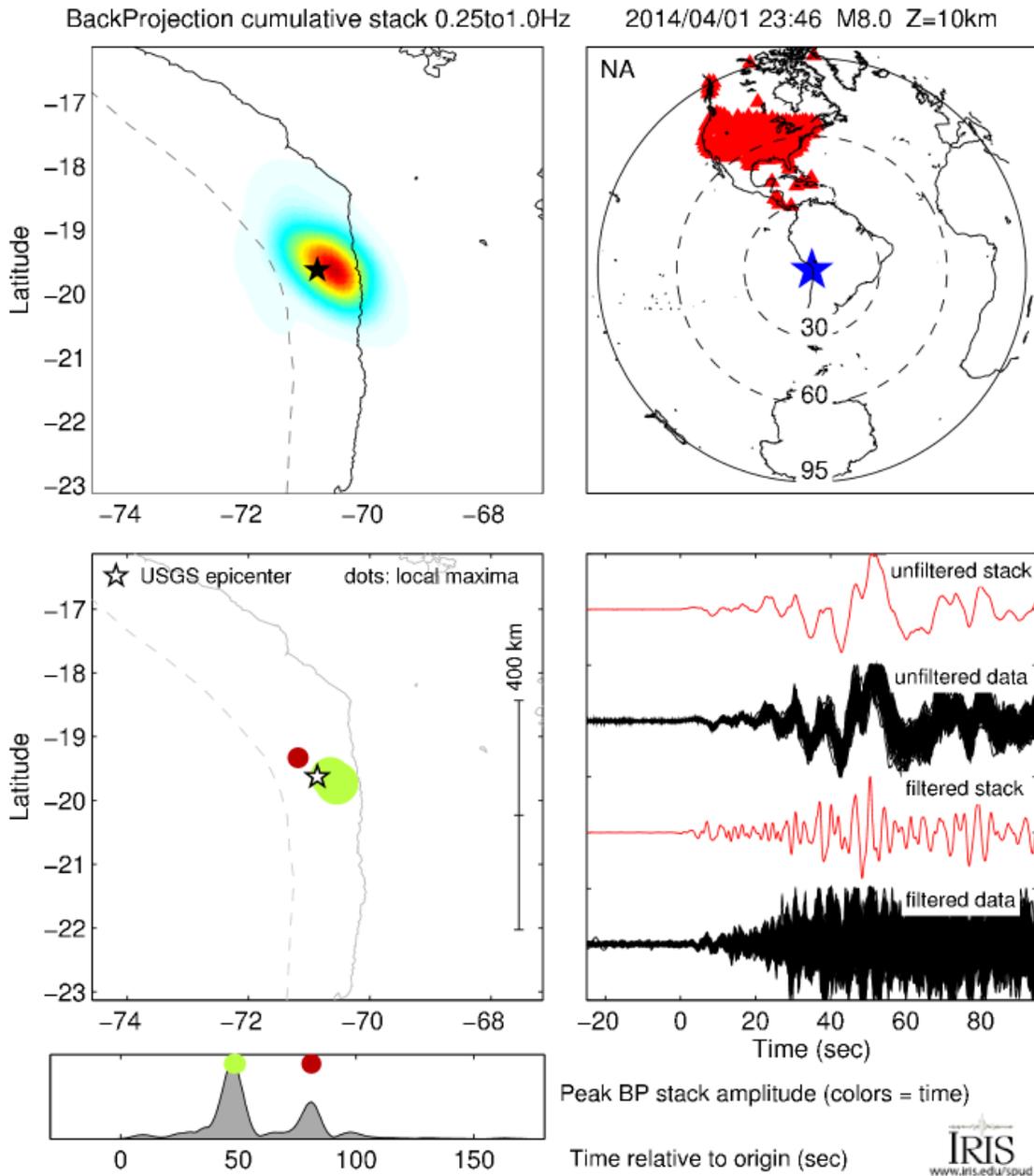


Figure 2: The "[back-projection](#)" data product from the recent M8.2 earthquake in Chile, showing the ability of the Transportable Array to unravel the source-time function and spatial distribution of rupture in major earthquakes.

new operational procedures. Station siting requires close collaboration with various state and federal agencies. New installation techniques are required to overcome permafrost, bears and cold. Data collection protocols need to be adjusted to compensate for limited communications and power restrictions. By the end of the first year of SAGE in September 2014, it is anticipated that 25 of the total of 290 stations planned for Alaska and neighboring Canada (Figure 4) will be installed.

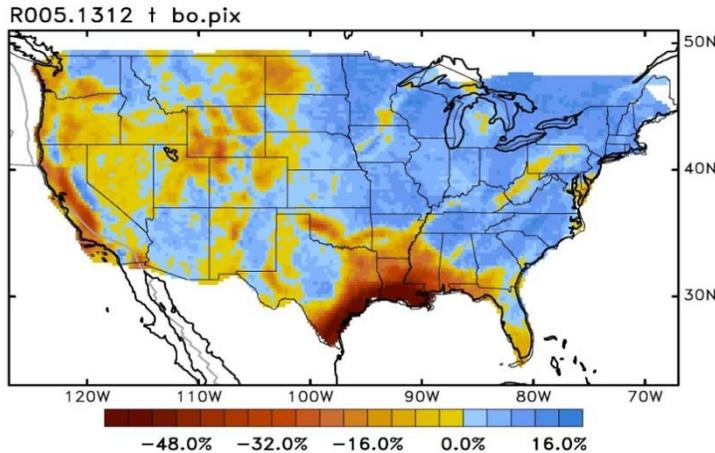


Figure 3: Map of 5-sec Rayleigh wave phase velocities derived from TA data by Göran Ekström showing shallow lithospheric structure across the US. [More details.](#)

IRIS Data Services continues to enhance the tools and services provided for access to the >250 Terabytes of seismic waveform data now resident in the Seattle archive. Over the past five years, a phased program to develop data products has been initiated under IRIS Data Services (<http://www.iris.edu/spud>). These products are intended to give seismologists new views into the data holdings and to provide non-seismologists with more meaningful interpretations of seismic data.

Some of the products, such as travel time plots, TA ground motion videos, source time functions and back-projections (Figure 2) are event-based and are automatically produced immediately following all significant earthquakes. In addition to providing quick looks at the data, they also can serve as very timely and dramatic teaching tools.

Following every major earthquake, IRIS Education and Public

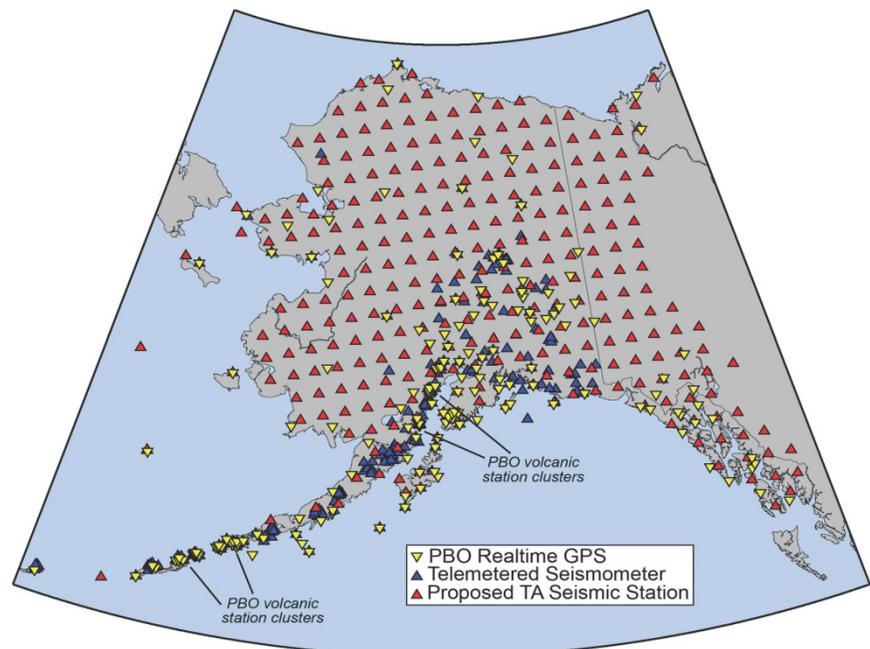


Figure 4: Map of planned TA stations in Alaska, along with existing PBO and regional telemetered network stations. For more details, see <http://www.usarray.org/alaska>.

Outreach also produces a set of "Teachable Moments" [power point slides](#) that have become go-to resources for classroom presentation the day after an earthquake hits the news.

Other products from Data Services, such as receiver functions, MT transfer functions and noise plots, are station-based and can be used as a tool for regional scientific investigations or assessment of station performance. Data Services also collaborates with other groups to distribute well-established community products such as the Global Centroid Moment Tensor (GCMT) catalog from Lamont; the synthetic seismograms from the Global ShakeMovie project at Princeton and provides tools for exploring contributed models of Earth structure.

Scientists across EAR and GEO are encouraged to consider ways in which they can make use of the resources provided by IRIS under SAGE to support their research and educational programs. More information can be found at <http://www.iris.edu/hq/retm>.

Upcoming Deadlines and Target Dates

[Hydrologic Sciences](#)

([NSF 13-531](#)) Full Proposal Deadline:
June 2, 2014

[Geophysics](#)

([NSF 12-598](#)) Full Proposal Deadline:
June 4, 2014

[Petrology and Geochemistry](#)

([NSF 14-501](#)) Full Proposal Deadline:
June 9, 2014

[Innovation Corp Teams Program](#)

([NSF 12-602](#)) Full Proposal Deadline:
June 16, 2014

[National Science Foundation Research Traineeship Program](#)

([NSF 14-548](#)) Full Proposal Deadline:
June 24, 2014

[Industry/University Cooperative Research Centers Program](#)

([NSF 13-594](#)) Letter of Intent Deadline:
June 27, 2014

[Innovation Corps Sites Program](#)

[\(I-Corps Sites\)](#)

([NSF 14-547](#)) Letter of Intent Deadline:
June 27, 2014

[Tectonics](#)

([NSF 09-542](#)) Full Proposal Deadline:
July 7, 2014

[Geobiology & Low-Temperature Geochemistry](#)

([NSF 09-552](#)) Full Proposal Deadline:
July 16, 2014

[Geomorphology & Land-use Dynamics](#)

([NSF 14-550](#)) Full Proposal Deadline:
July 16, 2014

[Sedimentary Geology & Paleobiology](#)

([NSF 12-608](#)) Full Proposal Deadline:
July 17, 2014

[NSF Earth Sciences Postdoctoral Fellowships](#)

([NSF 13-548](#)) Full Proposal Deadline:
July 18, 2014

[Faculty Early Career Development \(CAREER\) Program](#)
([NSF 14-532](#)) Full Proposal Deadline:
July 23, 2014

[GeoPrisms Program](#)
([NSF 14-556](#)) Full Proposal Deadline:
August 1, 2014

[International Research Experiences for Students \(IRES\)](#)
([NSF 12-551](#)) Full Proposal Deadline:
August 19, 2014

[EarthScope](#)
([NSF 14-552](#)) Full Proposal Deadline:
August 25, 2014

[Research Experiences for Undergraduates \(REU\)](#)
([NSF 13-542](#)) Full Proposal Deadline:
August 27, 2014

[Instrumentation and Facilities](#)
Full Proposals Accepted Anytime

The revised version of the [NSF Proposal & Award Policies & Procedures Guide \(PAPPG\), NSF 14-1](#) is effective for proposals submitted, or due, on or after February 24, 2014.



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National Science Foundation
4201 Wilson Blvd.
Arlington, VA
22230
phone: 703.292.8550
web: <http://www.nsf.gov>

This newsletter is designed to share information about NSF's Division of Earth Sciences. If you have comments or questions, please contact [Dr. Shemin Ge](#) at sge@nsf.gov.

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