EAR TO THE GROUND

Winter 2014

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

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Image Credit: Patricia Brooking

Yosemite National Park, CA

EAR Welcomes the new Division Director Dr. Carol Frost

Carol Frost joins EAR as Division Director on December 15, 2014. Since 1983, Carol has been professor in the Department of Geology and Geophysics at the University of Wyoming where she has also served in various administrative roles including associate provost, associate vice president for research, and vice president for special projects. Her research focuses primarily on granite petrogenesis and the evolution of

the continental crust, but she has also developed isotopic fingerprints for ground and surface waters including those co-produced with hydrocarbon resources. Her co-authored textbook, *Elements of Igneous and Metamorphic Petrology*, was published earlier this year by Cambridge University Press. She is former science editor of *Geosphere*, was CASE Professor of the Year for Wyoming, and has been awarded the University of Wyoming's highest faculty prize, the George Duke Humphrey Award. She is enthusiastic to represent the Earth Science community and advance basic geoscience research and education as EAR Director.

Join us at the American Geophysical Union Meeting

AGU What's New in the NSF Geosciences

December 16th, 2014
6:15 PM-7:15 PM
Moscone West Room 2003
San Francisco, CA

Leadership of the Directorate for Geosciences at the National Science Foundation (NSF) will update the community on the latest GEO programmatic and budget information. The report of the Advisory Committee for Geosciences, *Dynamic Earth: GEO Imperatives & Frontiers 2015-2016* will also be released at the town hall. The town hall will also include introductions of new Division Directors in Atmospheric & Geospace Sciences, Earth Sciences, and Ocean Sciences. Following short presentations, NSF will answer questions and discuss community concerns regarding geoscience research support.

AGU Career Advice Workshop: Preparing a Successful NSF Graduate Fellowship Application

December 16th, 2014
11:00 AM-12:00 PM
Moscone South Mezzanine 270
San Francisco, CA

This workshop is designed for undergraduates, pre-candidate graduate students, and faculty members who wish to know more about how to prepare a successful NSF Graduate Fellowship Program (GRFP) application. NSF GRFP winners from different disciplines will describe their experience preparing the application and answer questions about the application process.

AGU Workshop: Navigating the NSF System

December 17th, 2014
9:00 AM-12:00 PM
San Francisco, CA
Marriott Marquis
Golden Gate C2

The workshop is possible through a partnership of the Earth Science Women's Network and AGU Education

How do you make your proposal as NSF-savvy as possible? How do you best describe your broader impacts? How do you identify the best program for application? This workshop is open to all AGU Fall Meeting attendees and will be particularly helpful to early-career to mid-career participants, graduate students, post-docs, researchers, and tenure-track faculty thinking about applying for NSF funding for the first time.

Hands-On Workshop: Near Surface Geophysics for Hydrology

January 12th -16th, 2015

8:00 AM-4:00 PM EST
University of Arizona Tuscon, AZ

The Wyoming Center for Environmental Hydrology and Geophysics (WyCEHG), the University of Arizona, and CUAHSI will offer a Hands-on Workshop on Near Surface Geophysics for Hydrology from January 12-16, 2015.

Over the past 10 years, near-surface geophysics has become accessible even to non-experts, due to the development of reliable, easy-to-use instrumentation and intuitive, user-friendly software. As a result, new opportunities exist for applying near-surface geophysical techniques to problems of watershed hydrology and critical zone processes.

This hands-on workshop will introduce participants to several key methods of near-surface geophysics and their application to hydrology and critical zone processes. Techniques to be covered will include:

- Seismic refraction
- Ground-penetrating radar
- Electrical resistivity
- Magnetics
- Electromagnetic induction

The course will combine lecture and hands-on instruction with state-of-the-art geophysical equipment and software. Three field trips will be taken to collect field data at the Catalina Critical Zone Observatory near Tucson, Arizona; the data to be collected will then be analyzed during the course. Participants will also travel to the Biosphere2 facility in Oracle, AZ for a lecture and hands-on training. Registration Deadline: December 10, 2014

Surface Earth Processes Program Deadline Update

A primary objective of research support provided by the National Science Foundation (NSF) is to transform the boundaries of scientific understanding. To meet this objective, after the upcoming January 2015 deadlines, new solicitations will be released for programs in the Surface Earth Processes Section within the Division of Earth Sciences. These new solicitations will no longer require that proposals be submitted by a specific deadline. Beginning on April 16th, 2015 investigators will be allowed to submit proposals at any time. Despite this change, programs in the Surface Earth Processes Section will continue to maintain high-quality merit review through the use of panel and ad hoc reviews, as has been the practice in the Division of Earth Sciences for many years. For more details, see the full dear colleague letter http://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf15020.

Updates from the Tectonics Program

The Tectonics Program solicitation was revised this summer. The new solicitation, NSF 14-609, can be found at: http://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf14609

Important changes are: (1) refinement of program objectives; (2) deadline dates replaced by target dates (see the NSF Grant Proposal Guide (GPG) for definitions); (3) new limits on institutional eligibility and numbers of proposals an individual can be involved in; (4) new proposal preparation instructions, which include instructions on preparation of a conflict of interest spreadsheet; and (5) introduction of a new collaboratory track (Tectonic Collaboratories) aimed at fostering new research collaborations on frontier topics. Additional minor changes were made, thus it is important for applicants to carefully read the entire solicitation as well as the NSF Grant Proposal Guide (NSF 15-001): http://www.nsf.gov/publications/pub_summ.jsp?ods_key=papp).

The Tectonics Program anticipates that this year will be an important one for defining future directions. Several upcoming workshops are expected to help formulate those directions. Although early in the planning phases, members of the community are developing workshops aimed at: 1) fault zone research; 2) tectonics, surface processes, and climate; 3) analog modeling; and 4) tectonics and structural geology white paper. Tectonics program officers will alert the GSA Structural Geology & Tectonics membership to these workshops as details are known.

Volcanology Proposals

Volcanology is a burgeoning discipline in the Earth Sciences, which has resulted in a greater number of volcanologists in the academic world and more volcanology proposals being submitted to the National Science Foundation. Because there is no program in the Division of Earth Sciences with "Volcanology" or "Volcano" in its title, questions arise about how the division handles volcano-related proposals, and to whom those proposals should be submitted. Most volcano-science proposals outside of the petrology realm can be considered as either physical volcanology or volcano geophysics. Most physical volcanology proposals, including those whose focus is on dynamic modeling, should be submitted to the Petrology and Geochemistry program (CH); this also includes proposals where chemical data are the primary data to be acquired, such as gas studies. Proposals where the principal research tool involves geophysical measurement, including seismic, geodetic, and infrasound studies are typically submitted to Geophysics (PH).

Many volcanology proposals cover ground in both areas, particularly those that are collaborative. In that case, the proposals are evaluated (and commonly funded) jointly between the two programs. Petrology and Geochemistry and Geophysics purposely convene their panels at the same time, so that cross-disciplinary groups of experts can evaluate proposals that contain both volcano geophysics and physical volcanology. An increasing number of

volcanology proposals involve aspects of marine geology or atmospheric sciences. For these proposals, those programs will also be involved in evaluation and funding of volcano-science work. Several Program Directors have a great deal of experience working on volcanoes and they recruit volcanologists to serve on both the CH and PH panels.

As always, it is important to communicate with the Program Directors as you are preparing a proposal. This is especially true if you need advice as to which program to submit, or if there is some particularly novel aspect of your proposal that might require atypical evaluation. If your work crosses some of these programmatic boundaries, consider which community has the most to gain from the research proposed, and submit to that program as the lead.

In summary, although it is not specifically named in any program title, EAR works hard to assure that volcanology proposals are evaluated and funded both fairly and efficiently. Volcano science is alive and well at the National Science Foundation!

Earth-Life Transitions Competition Change

Last year (2013), *Sedimentary Geology & Paleobiology Program* (SGP) held its first Earth-Life Transitions (ELT) competition, conceived by the SGP Transitions Community Committee. The response was overwhelming and enthusiastic. It was with great pleasure that SGP was able to support 9 out of 37 projects. This translates to a success rate of 24%. The SGP Program is committed to supporting ELT into the future. The original ELT plans were for a competition to be held every two years, making 2015 the next call for proposals. Due to available resources among other considerations, SGP is sorry to report that the next ELT solicitation will be delayed until spring 2016. After the 2016 competition, pending available resources, ELT will return to the original every other year cycle (2018, 2020, etc.). A new SGP/EAR solicitation will soon be issued, so watch for additional details.

Future Infrastructure Needs in Surface Earth Processes

On October 5-7th in Chicago's Field Museum, EAR's Surface Earth Processes Section supported an initial workshop to fuel a community conversation on infrastructure needs to support grand research challenges in Earth surface processes. Such challenges have been laid out in community documents over the past three years, and workshop leader Lee Kump brought together 20 scientists to focus specifically on the underlying infrastructure needs over the coming decade. The group is working on an EOS article that summarizes the main outcomes, and ideas from the workshop will be a basis for further community deliberations in 2015. This timely discussion gives Program Managers in the Surface Earth Processes Section valuable insights to infuse into broader EAR and NSF conversations about infrastructure investments.

Broader Impacts – Examples from the Ground

In collaboration with EAR Program Directors, we have compiled a list of examples of broader impacts that we will continue to share with you in coming issues of *EAR to the Ground*. These examples range in scope, audience, and approach. However, they share some common traits: engaging relevant partners during the planning of the activity, implementation focused on the audience, and follow up activities. These examples include broader impacts activities related to outreach to the scientific community, undergraduate education, instrumentation, international collaborations, broadening participation, K-12 education, informal science education, and applications of research results. Our intent is not to have all the broader impacts in EAR look alike, but to have the broader impacts be highly impactful as well as informed, planned, and executed as integrated portions of research projects.

Geoscience Internship Program for Minorities and an Earth Science Professional Development Course for Middle School Teachers

Award Number: 1135382
FESD Proposal,Type I: Open Earth Systems: Whole planet models for global processes and major events in Earth's history
PIs: Peter L Olson (Johns Hopkins University), Anand Gnanadesikan (Princeton University), Linda A Hinnov (Johns Hopkins University), Darryn W Waugh (Johns Hopkins University)

Research: This Frontiers in Earth System Dynamics (FESD) award is investigating how global-scale interactions between the mantle, crust, core, ocean, and atmosphere exert controls on Earth's evolutionary trajectory and the roles these interactions played in decisive events in Earth's history.

Broader Impacts Activity: This research team is developing and testing two unique broader impacts activities. The first is called Geoscience Ingenuity. It's an innovative new internship program that is recruiting motivated high school students from underrepresented groups into the geosciences. The second is a professional development course for middle school teachers in Maryland to satisfy their certification needs and meet the state assessment criteria in the earth sciences.

Implementation: For the Geoscience Ingenuity program, the team partnered with the Baltimore Polytechnic Institute to recruit two intern students to work with the PIs on original research aligned with the goals of this award. The interns designed and executed their own research plans under the mentorship of the PIs. They also participated in group meetings to learn new ideas and build a network with experienced geoscientists.

The state of Maryland and Baltimore City approved the team's "Open Earth Systems: An Earth Science Course For Maryland Teacher Professional Development" as a 3 credit/ 3 Achievement Unit professional development course. Participants in this course receive 45

hours of lectures and supervised training in online Earth science instructional resources, laboratory methods, and field studies. Participants also build their own pre-K-12 lesson plans. These plans emphasize interactive student learning in the global climate system, natural disasters, Earth history and the fossil record, and plate tectonics and the rock cycle.

Impact: Through the Geoscience Ingenuity program, two high school students have had the opportunity to work directly with geoscience researchers at a university. One of these students received a semifinalist award in the National Intel Science Competition for the work completed on this internship project.

In the professional development course offered 7-20 July 2014, 28 teachers attended daily lectures and demonstrations and developed lesson plans. They also participated in the Baltimore Heat Island Project, deploying temperature sensors at their respective schools. These data will be used for an NSF funded project on heat islands. More information on this unique professional development course is available here: http://www.openearthsystems.org/course/.

Scientific progress comes in all shapes and sizes. Disparate fields, researchers and methods united by one thing: potential. Every NSF grant has the potential to advance knowledge and benefit society--what we call broader impacts. Find more in our new broader impacts section of NSF's webpage or check out #broaderimpacts on twitter.

Student Spotlight

Fabiola Cartegena and Alan Velez are undergraduate geology majors at the University of Puerto Rico Mayaguez. They joined Drs. Megan Elwood Madden and Lynn Soreghan, professors at the University of Oklahoma, in fieldwork associated with NSF-supported EAR research on weathering in fluvial systems. Fabiola and Alan accompanied the field party to participate in all aspects of sediment and water sampling, and simultaneously contributed invaluable cultural and linguistic expertise. Following the field component, Fabiola travelled to the University of Oklahoma to conduct sample preparation and analyses for sedimentological and geochemical laboratory work.

Shed spotlight on your student! Send a photo & description (100 word max) of their involvement in an EAR-funded project to rthornto@nsf.gov subject: "Student Spotlight".

Upcoming Deadlines and Target Dates

Industry/University Cooperation Research Centers Program (I/UCRC) (NSF 13-594)
Letter of Intent Deadline: January 5, 2015;
Full Proposal Deadline: January 5, 2015

Petrology and Geochemistry (CH) (NSF 14-501)
Full Proposal Target Date: January 12, 2015

Tectonics (NSF 14-609)
Full Proposal Target Date: January 12, 2015

Sedimentary Geology and Paleobiology (SGP) (NSF 12-608)
Full Proposal Deadline: January 15, 2015

Geobiology and Low-Temperature Geochemistry (NSF 09-552)
Full Proposal Dealine: January 16, 2015

Geomorphology and Land-Use Dynamics (NSF 14-550)
Full Proposal Deadline: January 16, 2015

Major Research Instrumentation Program (MRI) (NSF 15-504)
Full Proposal Deadline: January 22, 2015

Instrumentation and Facilities (NSF 15-516)
Full Proposals Accepted Anytime

National Nanotechnology Coordinated Infrastructure (NNCI) (NSF 15-519)
Full Proposal Deadline: February 2, 2015

EPSCoR Research Infrastructure Improvement Program: Track 2 (RII Track -2 FEC) (NSF 15-517)
Full Proposal Deadline: February 20, 2015

Industry/University Cooperation Research Centers Program (I/UCRC) (NSF 13-594)
Full Proposal Deadline: March 3, 2015

Genealogy of Life (GoLife) (NSF 15-520)
Full Proposal Deadline: March 25, 2015

National Nanotechnology Coordinated Infrastructure (NNCI) (NSF 15-519)
Letter of Intent Deadline: February 2, 2015;
Full Proposal Deadline: April 3, 2015

Partnerships for International Research and Education (PIRE) (NSF 14-587)
Full Proposal Deadline: May 15, 2015

Proposal & Award Policies & Procedures Guide **(PAPPG), (NSF 15-001) has been issued and becomes effective on December 26, 2014.**

@NSF_EAR: Earth Science news from the Division and beyond
@NSF: News and highlights from all directorates at NSF
@EarthScopeInfo: News, updates, and fun facts from the EarthScope Office
@GeoPRISMS: News and updates from the GeoPRISMS Office

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This newsletter is designed to share information about NSF's Division of Earth Sciences. If you have comments or questions, please contact Yusheng "Chris" Liu at yliu@nsf.gov

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This issue of *EAR to the Ground* was edited by Rachel Thornton and Yusheng "Chris" Liu.