EAR To The Ground

Fall 2013

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

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Blueberry Fields, Willamette Valley, OR
April Waters
http://www.aprilwaters.com

Update from the Division Director

Wendy Harrison

At the end of June, NSF's operating budgets were finalized: the FY13 budget for EAR is $173.7 million, which is $10 million, or 5.5%, below the FY12 level and 8.3% below the President's FY 13 request. These funds are allocated among EAR's various commitments, including its core programs and facilities ($160 million), and participation in cross-foundation initiatives through Science, Engineering and Education for Sustainability, SEES: Hazards ($1.75 million), SEES: Sustainable Chemistry ($1 million), and Water Sustainability and Climate ($7 million).

NSF's stated strategy in dealing with the reduced budget for FY13 is to protect its core mission and workforce and fulfill commitments to existing awards; thus, the most significant impact of sequestration is in a reduced number of new awards, see more details here. The vast majority of new awards we make are in the core science programs. Accordingly, the base budgets for core science programs in EAR (Geophysics, Petrology and Geochemistry, Tectonics, EarthScope, Instrumentation and Facilities, Integrated Earth Systems, Geobiology and Low Temperature Geochemistry, Hydrologic Sciences, Sedimentary Geology and Paleobiology, Geomorphology and Land-use Dynamics, and Education and Human Resources) have each been reduced by about 10% overall from FY 12. One notable exception was a strategic decision to provide increased funding to establish the Critical Zone Observatory Network, a set of sites that will address pressing interdisciplinary scientific questions concerning geological, hydrological, chemical, and biological processes and their couplings that govern critical zone system dynamics.

Those of you who also submit proposals to the Division of Ocean Sciences at NSF may have read the recent newsletter in which Division Director David Conover discusses some of the budget pressures related to heavy investment in large scale infrastructure (50% of OCE's budget is allocated this way). While EAR's infrastructure investment is much smaller, and almost all our budget is committed to support of research in core programs, a pattern of several years of flat funding, reduced capacity for university-based funds to augment research support, and the growing demand for a geoscience-capable workforce across the nation raise our level of awareness of the pressures on the funds EAR receives.

So, what will the upcoming fiscal year bring? The FY 2014 appropriations from both the House and Senate have been prepared by their respective committees yet remain far from reconciliation. It is within the realm of possibility that my next letter to you will continue the uncertain budget news of the last year and that we will enter 2014 with a Continuing Resolution based on the FY 2013 approved budget.

A set of 7 short videos addressing topics in water sustainability has been produced through a partnership between NSF and NBC Learn, the educational arm of NBC News. Two of EAR's program officers Tom Torgersen and Jessica Robin, worked extensively with production staff at NBC and Terry Davies from the GEO front office to provide the scientific background behind these videos. They feature the awards from the Water Sustainability and Climate portfolio. This opportunity allows EAR to showcase the research of our community with a national audience and promotes awareness of the role that basic research plays in informing water resource policy decisions. We are ever hopeful that broadening recognition of the benefits of scientific research will translate to strong support for NSF in the budget processes.

I would like to draw your attention, again, to the funding opportunities NSF offers in various programs in Innovation as an under-subscribed opportunity for EAR's investigators. Innovation and commercialization remain a Science and Technology Priority for the Obama Administration (see memorandum) and NSF has a number of solicitations that foster the transition of scientific discoveries into engineering applications and technology development. Geophysics program officer Raffaella Montelli manages these programs on behalf of the Geosciences Directorate and you can read the most recent newsletter on these programs here.

One action that is always helpful, particularly for new investigators, or for more seasoned scientists considering moving into the big multi-disciplinary opportunities, is to make contact with EAR's program officers who are an excellent resource as you prepare proposals for funding, even more so when budgets are stressed. In an article 'We don't Bite' in this newsletter, Jennifer Wade suggests how you can best approach and engage with our staff.

With the end of the summer in sight, EAR says farewell to our summer intern Brittany Gardner, a rising sophomore at Bennett College for Women in North Carolina where she is a major in journalism and media studies. Brittany says: "The best part for me about working at NSF (GEO/EAR) was just simply the opportunity given. I hope to return". We also say farewell to Lisa Park Boush, a program officer in Sedimentary Geology and Paleobiology (SGP) who returns to her home institution, University of Akron, Ohio. EAR warmly welcomes three new staff members and introduces them in the following section.

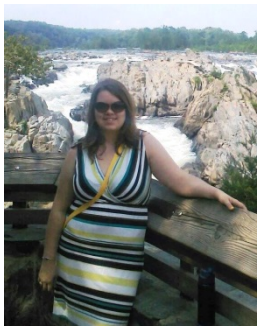
EAR Welcomes New Program Officer Dr. Margaret (Maggie) Benoit

Dr. Margaret (Maggie) Benoit joins EAR as a new IPA program director in the EarthScope program from her Associate Professor position in the Physics Department at the College of New Jersey. Maggie will be sharing duties with permanent EarthScope program director Dr. Greg Anderson. She will be replacing Dr. Charles (Chuck) Estabrook, who is completing his 3-year IPA position in EarthScope and is moving to a Deep Earth Processes Section-wide position. Maggie completed her Ph.D. in Geosciences from the Pennsylvania State University in 2005, and held a postdoc at MIT from 2005-2007 preceding her appointment with the College of New Jersey. Maggie has been active in the EarthScope and GeoPRISM science communities, especially as applied to eastern U.S. tectonics and structure. Welcome Maggie!

EAR Welcomes New Program Officer Dr. Yu Sheng (Christopher) Liu

Yu-Sheng (Christopher) Liu joins EAR as a new IPA program director in the Sedimentary Geology and Paleobiology (SGP) program from his Associate Professor position in the Department of Biological Sciences, East Tennessee State University. He completed BS degree at Sichuan University (China) and MS and Ph.D. from the Academia Sinica, followed by postdocs at the University of Vienna (Austria), Chiba University (Japan), the Humboldt University of Berlin (Germany), and the University of Saskatchewan (Canada). His research uses proxy data (mainly fossil plants) to quantitatively reconstruct the Cenozoic terrestrial paleoclimates in the North Hemisphere, with a particular attention to East Asia and North America. Other research interests include systematic paleobotany, paleoecology, paleobiogeography, and associated SGP fields. He now also serves as an editorial member for *Palaeontographica Abt. B Paläophytologie* (Palaeobotany/Palaeophytology). He looks forward to serving the EAR community while working at NSF.

EAR Welcomes New Science Assistant Rachel Thornton



Rachel Thornton joins NSF as a new science assistant in the Surface Earth Processes section of Earth Sciences from her previous position with Chesapeake Energy. Rachel had been working as an early-career field geologist in the oil and gas industry since completing a BS in Geology from Kent State University. During her time in Kent she worked as an undergraduate instructor for introductory geology courses, was an active member of Sigma Gamma Epsilon (SGE), attended regional Geological Society of America (GSA) meetings, and completed an internship with the Cleveland Museum of Natural History mapping bedrock and studying soft sediment deformation structures. Rachel had been a volunteer with the Cincinnati Museum of History and Science where she led hands-on educational sessions and plans to remain an active volunteer with similar organizations here in Virginia. She is eager to assist and learn from the EAR crew.

EAR Says Farewell to Dr. Lisa Park Boush

Lisa Park Boush, an IPA program director in the Sedimentary Geology and Paleobiology (SGP) program, is leaving EAR after 3 years of service. In addition to serving in SGP, Lisa has been a program officer in Coastal SEES, Advancing Digitization of Biodiversity Collections (ADBC), and EarthCube. Within SGP, Lisa helped initiate a new funding opportunity, "Earth-Life Transitions" (ELT). She was one of the initial program officers for EarthCube and will continue to be involved with it from the community perspective. During her time in EAR, Lisa convened a series of three-hour "Navigating the NSF System" at the Geological Society of America and the American Geophysical Union meetings. She also served on the Interagency Working Group on Scientific Collections.

NBC Learn Video Series: Water Sustainability

The NBC Learn video series on water sustainability include seven 5-minute videos that are freely available to the public and can be useful as classroom and outreach materials. The seven videos below include one explaining key hydrologic terminologies and six highlighting research funded by NSF's Water, Sustainability, and Climate Program.

1. ***Sustainability: The water cycle***
2. ***Sustainability: Water--the Ogallala Aquifer***, featuring: David Hyndman of Michigan State University and Jim Butler from Kansas Geological Survey
3. ***Sustainability: Water--Sierra Nevada snow pack and snow melt***, featuring: Martha Conklin and Tom Harmon of the University of California-Merced
4. ***Sustainability: Water--dead trees and dirty water in the Rockies***, featuring: Reed Maxwell of Colorado School of Mines and John Stednick of Colorado State University
5. ***Sustainability: Water--Los Angeles and water imports***, featuring: Stephanie Pincetl and Mark Gold of University of California, Los Angeles
6. ***Sustainability: Water--urban streams in Baltimore***, featuring: Claire Welty of the University of Maryland
7. ***Sustainability: Water--Lake Erie and nutrient loading*** featuring: Stanford University's Anna Michalak, University of Toledo's Thomas Bridgeman and Heidelberg University's R. Peter Richards

We Don't Bite

Program Director Jennifer Wade

Many of you have asked, "What's the most important thing I can do to make my proposal more competitive?" That's easy: call your Program Director. We know that can seem hard, so we wanted to share some advice to make it easier, beginning with the title of this note.

Some things to keep in mind:

Most Program Directors have been in your shoes. Many of us were (or still are currently!) PI's with active research programs, who had to write proposals, do research, and publish.

We are allies and advocates. We are here to serve the community (that's you) and the science.

We want you to be competitive in a fair process. We want to help you understand our program(s) and be able to craft the best proposal you can. We also want to help your colleagues the same way. We want to ensure the process is equitable, and that each PI has the best competitive chance he/she could have.

We don't always know what our budget is until the very last minute. We know it's frustrating to wait for a decision, but there are things beyond our control that influence how long the process may take.

Don't take declines personally. We don't enjoy declining proposals any more than you like being declined, but a number of factors go into every funding decision in EAR. Before talking with your Program Director after a decline, take the time to read through the reviews, and organize any questions you have so that the conversation can be meaningful and productive.

Some practical guidance:

- *Do your homework.* Many questions that we field are things that can be answered by simply reading the Proposal and Award Policies and Procedures Guide or the solicitation. Be sure to read the most recent version, as things do change from year to year.
- *Use your Sponsored Research Office.* Nearly every institution has one, and it's staffed with people whose job it is to know the NSF rules.
- *Try not to cold-call us.* Unless you have a short procedural question, we need some time to look up your proposal or award. It's best to send an email with a quick summary of your question, along with times that are good for a conversation, if you'd like one. If you're writing about a specific proposal or award, make sure you include the 7-digit number associated with it.
- *Always have your proposal/award number on hand.* All of our internal information relating to you and your submissions is tied to that number, so it's the fastest way for us to look you up.
- *If you see us at a meeting, say hello!* EAR is full of friendly people, most of whom see talking with PI's as an important part of the job. We often staff the NSF booth at GSA and AGU, and we wander the lecture halls just like you do. Don't be afraid to introduce yourself – we like putting faces to names. That said, if you want to talk for longer than a few minutes at a meeting, drop your Program Director an email to set up a time.
- *If you're not sure who to talk to, check the website for a program close to your science.* Clicking on a program on the EAR home page will show you who manages the program, and how to get in touch.

There's even more great advice in this *Chronicle of Higher Education* article. Hope to hear from you soon! And remember: we really don't bite. Promise.

Investing in Diversity in the Geosciences: Insights from the OEDG Program *Jill Karsten*

Since 2002, the Opportunities for Enhancing Diversity in the Geosciences (OEDG) program has been a mainstay of GEO's efforts to broaden participation of traditionally underrepresented minorities in the geosciences. The OEDG program was created in response to recommendations from a workshop convened by GEO's Advisory Committee. The primary goal of the program has been to engage a diverse population of students in learning about – and pursuing advanced degrees and careers in – the geosciences. Raising public awareness of the importance and relevance of the geosciences among diverse audiences has been the secondary goal. Over the past decade, the OEDG program has supported a variety of planning grants, proof-of-concept projects, and larger full-scale implementation efforts. Through these projects, GEO has helped to develop a rich array of culturally-tailored opportunities for learning about geoscience career pathways and participating in geoscience research experiences, and has established networking and mentoring programs tailored for diverse student audiences and the educators who work with them. GEO has helped to build capacity in the geosciences at minority-serving institutions and has established an enthusiastic and effective community of educators, administrators, students and organizations dedicated to increasing diversity in the geosciences.

Collection of evaluation data for individual OEDG projects has helped to improve the impact of specific projects and increase our understanding of which approaches are more successful in achieving OEDG program goals. In addition, GEO has conducted a decade-long, program-wide evaluation of the OEDG portfolio through a contract to the American Institutes for Research (AIR). Synthesis of results from both the project- and program-level evaluation activities has identified evidence-based "best practices" as essential for achieving success in broadening participation in the geosciences. As a general rule, successful programs had strong evaluation components, which both helped PIs to make adjustments during implementation and also acquire the evidence that strengthened their potential for sustainability after the grant ended. Most of the successful projects involved activities that allowed students to "do" geoscience and provided some type of structure that helped students continue to be engaged. Even when they had a finite duration, projects that were able to catalyze important cultural changes in departments and institutions – thereby creating a more welcoming and supportive environment for students – had lasting, positive impacts.

The most successful OEDG projects included the following design elements:

- Acknowledged and respected the different perspectives of the target audiences during design and implementation phases
- Involved target audience representatives in the planning phases as equal stakeholders
- Provided authentic geoscience research experiences and opportunities to go "in the field"
- Incorporated strong mentoring components
- Included role models (e.g., faculty or graduate students) as leaders in the project
- Addressed professional development needs of all personnel involved (including project leaders)
- Planned for sustainability at the beginning (usually through institutionalization or acquisition of instrumentation, in order to increase research capacity)
- Broadened a project's reach through time, through engagement of stakeholders and networking
- Demonstrated the cultural, personal and/or professional relevance of the geosciences to participants
- Developed and strengthened institutional partnerships, especially between two-year and four-year colleges/universities and minority-serving and majority-serving institutions

Insights on "worst practices" also have been gained through the evaluation of OEDG projects. The least successful projects committed one or more of these mistakes:

- Used one-time or short-term interventions, with no follow-on opportunity to sustain engagement
- Failed to provide advance training to PIs or students before they do outreach or mentoring
- Intervened too late in a student's career to influence their future behavior
- Failed to offer compensation for students' time or offered non-competitive support packages to students who had competing economic pressures
- Used students or teachers as cheap labor on research projects
- Failed to incorporate formative evaluation and use the results to improve the project implementation
- Failed to plan for sustainability of effective programs at the very beginning

More information about the programs that have been supported through the OEDG program can be found here.

Earth Life Transitions

The SGP program successfully completed its first Earth-Life Transitions (ELT) competition in Spring, 2013. ELT's objective is to support research by multi-disciplinary teams of scientists to address critical questions about Earth-Life interactions in Deep Time. We received 37 proposals, from which, two awards were made at the Track 1 (<$500k) level and six awards were made at the Track 2 ($1-$1.5million) level. The awards spanned intellectual and integrative activities encompassing the entire geological time scale. Projects awarded may be found here. There will be an ELT workshop sometime in the next year to discuss these projects and other areas of Earth-Life Transitions.

Coastal Science Engineering and Education for Sustainability (SEES) competition

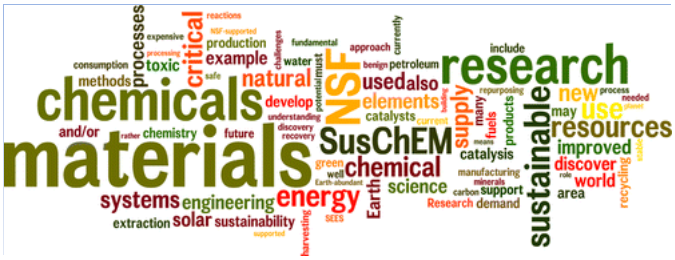
Coastal SEES is a new multi-directorate program involving Biological Sciences, Engineering, Geosciences, and Social, Behavioral and Economic Sciences within NSF's SEES portfolio. It is focused on the sustainability of coastal systems and the integration across natural environmental and human dynamics in order to contribute to our understanding of complex systems. There were 229 proposals representing 111 unique projects (66 Track 1, and 45 Track 2) that were competed. Projects were evaluated through a two-stage peer review process: (1) Topically-oriented virtual panels and (2) On-site panel. There were 29 projects (16 Track 1,13 Track 2) that were forwarded for this final evaluation stage, and of these projects, 8 Track 1 projects and 5 Track 2 projects were awarded. We anticipate another competition in FY 14. Please look for a revised solicitation and deadline soon.

FY 14 Sustainable Chemistry, Engineering, and Materials (SusChEM) Initiative Posted

In FY 13, NSF started an initiative to encourage and foster research in Sustainable Chemistry, Engineering, and Materials (SusChEM), partially in response to the mandate of the America COMPETES Reauthorization Act of 2010. The SusChEM initiative addresses the interrelated challenges of sustainable supply, engineering, production, and use of chemicals and materials.

Does your EAR proposal involve any aspect of sustainable chemistry, engineering or materials? Examples include but are not limited to fundamental Earth science linked to the following:

- Physicochemical properties of minerals (e.g. catalytic properties), particularly projects with implications for the development of materials based upon Earth-abundant elements
- Cycling of critical elements (e.g. rare earth elements, phosphorus)
- Environmental remediation
- Sustainable agriculture



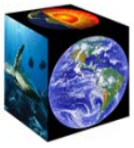
*Please see the SusChEM FY 14 Dear Colleague Letter for further information

*Questions? Contact EAR-SusChEM@nsf.gov

For fundamental Earth science proposals involving any aspect of sustainable chemistry, engineering, or materials, consider making proposal submissions to any appropriate EAR core program with the proposal title as "**SusChEM: Name of Your Proposal**." Due dates are those of the chosen core program. Additional guidance on NSF's investment in this area can also be found in this article in *ACS Sustainable Chemistry and Engineering.*

Geochronology EarthCube Workshop

Workshop: Bringing Geochronology into the EarthCube framework



October 1st-3rd, 2013
University of Wisconsin-Madison: Pyle Center

More info can be found at
http://earthcube.ning.com/
Further direct inquiries can be made at
earthcubejeochron@gmail.com

This is a broad-based, community-wide workshop to discuss data and cyberinfrastructure needs as they relate to geochronology. Specific goals include: gathering requirements on EarthCube science-drivers, data utilities, user-interfaces, modeling software, tools, and other needs so that EarthCube can be designed to help geoscientists more easily do the science they want and need to do. Community input from these workshops is helping to direct and shape the function and form of what EarthCube will be.

Upcoming Activities from the Board on Earth Sciences and Resources (BESR) of the National Research Council (NRC)

BESR Director Elizabeth A. Eide

Development of Unconventional Hydrocarbon Resources in the Appalachian Basin: A Workshop
This workshop from September 9th-10th, 2013 in Morgantown, West Virginia will be webcast and will include presentations examining various geoscientific and geotechnical aspects of unconventional hydrocarbon development. This project is sponsored by West Virginia University. Additional details may be found here.

25th Anniversary Public Meeting
The meeting will take place November 18th, 2013 from 9:00am -5:00pm at the National Academy of Sciences Building (2101 Constitution Avenue, Washington D.C.) and will include contributions from a range of speakers and opportunity for collegial discussion on the past, present, and future of Earth Science policy and research.

The Board and three of its standing committees oversaw the release of the consensus report *"Induced Seismicity in Energy Technologies"* in June 2012. As part of the continuing dissemination of that report, the Department of Energy, which sponsored the study, supported the NRC's development of a video which can be viewed on the National Academy's YouTube channel, "Energy Technologies and Manmade Earthquakes –What's the Connection" to accompany the report.

Upcoming Deadlines and Target Dates

You can find the full list of active GEO funding opportunities on the Directorate for Geosciences website, but here are some programs of particular interest to the EAR community:

Water Sustainability and Climate
(NSF 13-535) Full Proposal Dealine: September 10, 2013

Critical Zone Observatory National Office (CZO-NO)
(NSF 12-595) Full Proposal Deadline: September 16, 2013

Innovation Corps Teams Program (I-Corps Teams)
(NSF 12-602) Full Proposal Deadline: September 16, 2013

Cooperative Studies of the Earth's Deep Interior (CSEDI)
(NSF 11-548) Full Proposal Deadline: September 23, 2013

Paleo Perspectives on Climate Change (P2C2)
(NSF 13-576) Full Proposal Deadline: October 15, 2013

Advancing Digitization of Biodiversity Collections (ADBC)
(NSF 12-565) Full Proposal Deadline: October 18, 2013

East Asia and Pacific Summer Institutes for U.S. Graduate Students (EAPSI)
(NSF 12-498) Full Proposal Deadline: November 14, 2013

Integrated Earth Systems
(NSF 12-613) Full Proposal Deadline: November 14, 2013


Program Directors: Leonard Johnson and Tom Torgersen, Integrated Earth Systems

Geophysics (PH)
(NSF 12-598) Full Proposal Deadline: December 4, 2013

Hydrologic Sciences (HS)
(NSF 13-531) Full Proposal Deadline: December 5, 2013

Instrumentation and Facilities:
Full Proposals Accepted Anytime

Jonathan Wynn, Program Director
Instrumentation and Facilities

The revised version of the NSF Proposal & Award Policies & Procedures Guide (PAPPG), NSF 13-1 is effective for proposals submitted, or due, on or after January 14, 2013.

@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

The Division of Earth Sciences
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GeoPRISMS

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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 Dr. Shemin Ge at sge@nsf.gov.

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This issue of EAR to the Ground was edited by Rachel Thornton and Shemin Ge