

SELECTED CROSSCUTTING PROGRAMS

NSF crosscutting programs include interdisciplinary programs and programs that are supported by multiple directorates. Examples of major crosscutting activities include the following:

ADVANCE

In FY 2013, ADVANCE will fund transformative efforts to address the systemic barriers to women's full participation in academic science, technology, engineering, and mathematics (STEM) with funding of \$17.06 million, a decrease of \$890,000 below the FY 2012 Estimate of \$17.95. This decrease reflects a reprioritization of funding pending the results of an evaluation currently underway. A major focus will be broadening the spectrum of institutions participating in the program. The IT-Catalyst program component, which provides support to institutions to undertake institutional self-assessment activities, will be used to support predominantly undergraduate institutions, teaching-intensive colleges, community colleges, minority-serving institutions, and women's colleges. The funding will also support new awards under the Institutional Transformation (IT) program component as well as data collection to capture the impact of prior ADVANCE awards and as part of an overall program evaluation.

ADVANCE is in the process of completing a retrospective evaluation of the first two cohorts of the program. The evaluation is examining such questions as:

- What is the impact of ADVANCE on institutional transformation?
- What is the impact of ADVANCE beyond the initially funded institutions (e.g., publications, new collaborations)?
- How and why have successful programs worked in specific institutional contexts?

The evaluation methodology includes an analysis of project documents and data, survey results, interviews, and comparative data from the Survey of Earned Doctorates (SED). The evaluation will be completed in early FY 2013. Results are expected to inform future program budgets.

Climate Change Education Program

The FY 2013 Request provides \$6.26 million for the Climate Change Education (CCE) program, a decrease of \$3.74 million below the FY 2012 Estimate level of \$10.00 million. The Directorates for Education and Human Resources, and Geosciences, will continue to support this activity. In FY 2013, CCE, formerly part of the Science, Engineering, and Education for Sustainability (SEES) portfolio, is refocused to support the Learning and Understanding Sustainability focus area of the Expeditions in Education (E²) activity. The Directorate of Biological Sciences and the Office of Polar Program concludes its participation in CCE in FY 2013 as a result of this refocusing of activities. CCE is a multi-disciplinary, multi-faceted climate change education program that is enabling a variety of partnerships within formal and informal settings, including partnerships among K-12 education, higher education, the private sector, related non-profit organizations, and relevant education and/or climate-related policymakers. It will support individual investigators and multidisciplinary teams of STEM researchers and educators in a range of activities, including those with a local, regional, and/or global scope.

FY 2013 investments continue support for Phase II Climate Change Education Partnership (CCEP-II) projects initiated in FY 2012. Climate scientists, learning scientists, and education practitioners from formal or informal settings are engaged in efforts to foster a deeper understanding of, and engagement with, the complex processes of the climate system and the potential impacts of a changing climate, through activities that lead to development, evaluation, dissemination, and increased adoption of effective, high quality educational programs and resources. Development and implementation of a strategy for program-wide evaluation of the combined CCEP-II projects is a priority for FY 2013. In addition, NSF continues collaboration with NASA and NOAA to support annual tri-agency principal

investigator meetings for climate change-education related awards and to develop common evaluation approaches. CCE program activities continue to be informed by discussions with the National Research Council, through the auspices of its Climate Change Education Roundtable.

Enhancing Access to the Radio Spectrum (EARS)

NSF's FY 2013 Request provides \$50.50 million for EARS, an increase of \$35.50 million above the FY 2012 Estimate level of \$15.0 million. EARS' purpose is to fund interdisciplinary research that can enhance the efficiency with which radio spectrum is used, and/or lead to improved access to wireless services for all Americans. The increased support for EARS in FY 2013 is consistent with the recent NSF supported workshop report, *Enhanced Access to the Radio Spectrum: A Path Forward*¹, which highlighted the need for research on new and innovative ways to utilize the spectrum more efficiently. EARS is a collaboration among the Directorates for Computer and Information Science and Engineering (CISE), Engineering (ENG), Mathematical and Physical Sciences (MPS), and Social, Behavioral, and Economic Sciences (SBE). It will fund innovative collaborative research that transcends the traditional boundaries of existing disciplinary programs.

Faculty Early Career Development (CAREER)

The FY 2013 Request provides \$216.49 million for the CAREER program, an increase of \$10.14 million over the FY 2012 Estimate level of \$206.35 million. This will result in approximately 40 more CAREER awards than in FY 2012. CAREER awards support exceptionally promising college and university junior faculty who are committed to the integration of research and education and who are most likely to become the leaders in their fields. A Committee of Visitors will review the CAREER program in 2012, and its report is expected to be available in 2013.

Graduate Fellowships and Traineeships

The FY 2013 Request provides \$321.67 million for NSF's flagship graduate fellowship and traineeship programs. This funding will enable NSF to support an estimated 6,950 graduate students, including 2,000 new Graduate Research Fellows in FY 2013.

- \$242.98 million for the Graduate Research Fellowship (GRF) program, an increase of \$44.84 million over the FY 2012 Estimate of \$198.14 million. As indicated below, the Budget Request increase is needed primarily to support the increased number of fellows, and also the proposed increases in the cost of education allowance and stipend. The fellowship provides up to 3 years of support over a 5-year period to graduate students in all STEM fields. In FY 2013, 2,000 new fellows will be supported maintaining the doubling of new fellowships awarded as achieved in FY 2010. In order to maintain the competitiveness and appeal of the GRF program, NSF increased the cost of education (COE) allowance in FY 2012 from \$10,500 to \$12,000. The COE allowance level is consistent with the America COMPETES Reauthorization Act of 2010. NSF will address inflationary pressures on the long-stagnant GRF stipend level implementing a stipend increase to \$32,000 in FY 2013. In FY 2013, GRF funding will be drawn equally between the R&RA and Education and Human Resources (EHR) accounts. In FY 2012, GRF is initiating and conducting a phase-one evaluation framing study. In FY 2013, a GRF full-scale longitudinal study will be initiated.

¹ www.nsf.gov/mps/ast/nsf_ears_workshop_2010_final_report.pdf

NSF Graduate Research Fellowship Program

	Total Number of Fellows	Number of New Fellows	Projected Fellows on Tenure ¹
FY 2012 Estimate	7,800	2,000	4,200
FY 2013 Estimate	8,900	2,000	4,900

¹Fellowship tenure status is the period of time during which fellows actively utilize the fellowship award to pursue an advanced degree in the science, technology, engineering, or mathematics fields supported by the National Science Foundation.

- \$51.69 million for the Integrative Graduate Education and Research Traineeship (IGERT) program, a decrease of \$8.13 million from the FY 2012 Estimate of \$59.82 million. CISE and EHR have reduced funding support of IGERT to direct resources to other activities in FY 2013. IGERT will support comprehensive Ph.D. programs that are innovative models for interdisciplinary education and research and that prepare students for academic and non-academic careers. This reduced funding will support approximately 1,250 IGERT trainees, which is about 200 less than the number in FY 2012.
- \$27.00 million for the NSF Graduate STEM Fellows in K-12 Education (GK-12) program, an increase of \$50,000 from the FY 2012 Estimate of \$26.95 million. The GK-12 program was initiated in 1999, and during the subsequent years more than 300 projects have been funded throughout the Nation. The GK-12 program did not hold a new competition in FY 2011 and will not hold future competitions because it has been terminated. The program has achieved its goal of providing models for other organizations to consider, along with evaluation data, in developing their efforts. The FY 2013 amount will be used to cover commitments to grants made in prior years, and it will support an estimated 800 GK-12 graduate fellows.

Long-Term Ecological Research (LTER)

The FY 2013 Request provides \$27.97 million, an increase of \$570,000 above the FY 2012 Estimate level of \$27.40 million. LTER supports fundamental ecological research that requires long time periods and large spatial scales. This program supports a coordinated network of more than two dozen field sites that focus on: 1) understanding ecological phenomena that occur over long temporal and broad spatial scales; 2) creating a legacy of well-designed and documented ecological experiments; 3) conducting major syntheses and theoretical efforts; and 4) providing information necessary for the identification and solution of environmental problems. LTER field sites represent a diversity of habitats in continental North America, the Caribbean, Pacific Ocean, and the Antarctic, including coral reefs, deserts, estuaries, lakes, prairies, various forests, alpine and Arctic tundra, urban areas, and production agriculture. Beginning in FY 2012, NEON infrastructure will be co-located at eleven LTER sites, as the LTER network and NEON are complementary networks that enhance ecological research in different ways. NEON is a continental-scale infrastructure facility providing standardized physical and data resources to researchers and educators. LTER is a network of long-term research projects aimed at understanding processes in a wide range of ecosystems. The co-location of NEON infrastructure at LTER sites will enable innovative research building on the long history of LTER research with the new capabilities to quantitatively scale the site-based knowledge to regional and continental scales. The increased support for LTER in FY 2013 covers planned periodic increases to cover higher costs as sites are renewed.

Research at the Interface of the Biological, Mathematical, and Physical Sciences (BioMaPS)

The FY 2013 Request provides \$30.17 million, an increase of \$10.17 million above the FY 2012 Estimate of \$20.00 million for the BioMaPS program, an interdisciplinary partnership between the Directorates for Biological Sciences, Mathematical and Physical Sciences, and Engineering. Support for BioMaPS is

consistent with the recommendations of the National Academies of Science study, Research at the Intersection of the Physical and Life Sciences.² BioMaPS seeks to discover fundamental new knowledge at the intersections of the biological, mathematical and physical sciences, and engineering in order to enable innovation in national priorities such as clean energy, climate science, and advanced manufacturing that are essential to the Nation's prosperity, economic competitiveness, and quality of life. The increases funding in FY 2013 reflects the overall alignment with these funding priorities.

Research Experiences for Teachers (RET)

The FY 2013 Request for NSF's RET program totals \$5.47 million, a decrease of \$1.51 million below the FY 2012 Estimate level of \$6.98 million. Funding will provide pre-service and in-service K-12 teachers, and community college faculty with discovery-based learning experiences. The professional development gained by the participants through this unique experience has enriched their performance in the classroom and their guidance of students toward engineering. A formal evaluation by SRI International was completed in 2007, which documented achievements of the RET program from 2001 to 2006.³ As a result, some minor adjustments were made to the program, for example, extending the minimum duration of the program from four weeks to six weeks.

Research in Undergraduate Institutions (RUI)

The FY 2013 Request for NSF's RUI program totals \$40.15 million, equal to the FY 2012 Estimate. The RUI activity supports research by faculty members of predominantly undergraduate institutions through the funding of (1) individual and collaborative research projects, (2) the purchase of shared-use research instrumentation, and (3) Research Opportunity Awards for work with NSF-supported investigators at other institutions.

Research Experiences for Undergraduates (REU)

The FY 2013 Request for NSF's REU program totals \$68.40 million, an increase of \$2.41 million from the FY 2012 Estimate of \$65.99 million. The request for FY 2013 reflects the importance of undergraduate research experiences in building students' interest and competence in STEM disciplines, and aligns with the Administration's focus on improving undergraduate STEM education. The increase is consistent with the external evaluation of REU conducted between 2003 and 2006, and also with a survey of former REU participants conducted in 2009 by SRI International, which found that undergraduate students who participate in hands-on research are more likely to pursue advanced degrees and careers in STEM. REU grants involve students at all stages of undergraduate education, including the freshman and sophomore levels, which enhances retention and graduation rates in STEM. REU Supplements allow students to join research projects that are supported by NSF research grants. REU Sites support cohorts of students to conduct research within STEM disciplines or on topics that cut across disciplines. Most of the students in an REU Site come from outside the host institution. This feature enables the program to involve students in research who might not otherwise have the opportunity, particularly students from institutions where research activities are limited. The REU program encourages partnerships between community colleges and baccalaureate degree-granting institutions to provide research opportunities for community college STEM students and faculty. This emphasis will continue in FY 2013 as a means of broadening participation in STEM and fostering educational pathways and transfer opportunities for students in STEM programs. In FY 2012, EHR's evaluation group is exploring the feasibility of how best to evaluate themes, such as research experience that cross NSF's STEM education programs. REU is included in the FY 2012-FY 2013 Agency Priority Goal focusing on undergraduate programs.

² www.nap.edu/catalog.php?record_id=12809

³ <http://csted.sri.com/content/evaluation-national-science-foundations-research-experiences-teachers-ret-program-2001-2006>

Science and Technology Centers (STCs)

The FY 2013 Request for the Science and Technology Centers program totals \$74.39 million, an increase of \$23.64 million over the FY 2012 Estimate level of \$50.75 million. The funding increase in FY 2013 includes support for a new class of STCs. For additional information, see the NSF Centers Programs section of this chapter.

