

National Science Foundation Appropriations: FY 2012

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The National Science Foundation (NSF) is an independent federal agency created by Congress in 1950 "to promote the progress of science; to advance the national health, prosperity, and welfare; to secure the national defense..." NSF serves as the funding source for about 20 percent of all federally supported basic research conducted by America's colleges and universities. Key programs of interest to the Earth sciences are mainly within the Research and Related Activities, including the Geosciences Directorate and Office of Polar Programs. Earth sciences are also covered in the Education and Human Resources Directorate, and research equipment funding.

FY12 NSF Appropriations Process

<u>Account</u>	<u>FY10 Enacted/FY11 CR (\$million)</u>	<u>President's FY12 Request (\$million)</u>	<u>House Action (\$million)</u>	<u>Senate Action (\$million)</u>	<u>Conference Committee Action (\$million)</u>
National Science Foundation (total)	6,860	7,767	6,860	6,700	7,033
Research & Related Activities	5,563.9	6,253.5	5,607	5,443	5,719
<i>Geosciences Directorate</i>	889.6	979.2			
Atmospheric and Geospace Sciences	259.8	286.3			
Earth Sciences	183.0	207.3			
Ocean Sciences	348.9	384.6			
Integrative & Collaborative Education & Research	97.9	100.9			
-- Incorporated Research Institutions for Seismology	12.4	12.4			
-- EarthScope operations	25	26			
-- Academic Research Fleet	78	69.4			
--National Astronomy and Ionosphere Center	2.2	3.2			
--National Center for Atmospheric Research	97	100			
-- Integrated Ocean Drilling Program (IODP)	43.4	45.4			
<i>Office of Polar Programs</i>	451	477.4			

Major Research Equipment & Facilities (MREFC)	117.1	224.7	100	117	167
--Ocean Observatories Initiative (OOI)	16.5	35.7			
Education & Human Resources	861	911.2	835	829	829

*Has not been voted upon in either chamber as of November 15, 2011

President's Request

National Science Foundation, Increases in Geosciences

The Geosciences Directorate (GEO) will consider several interdisciplinary initiatives in the President's FY 2012 budget request beyond regular funding of research and related activities. Major investments include \$282.7 million (+\$87.2 million over FY2010/CR FY2011) for the Science, Engineering and Education for Sustainability (SEES) NSF-wide program, \$16 million (first time request) for Cyberinfrastructure Framework for 21st Century Science and Engineering (CIF21), \$10 million (first time request) for Creating a More Disaster Resilient America (CaMRA), \$13 million (-\$1.6 million below FY2010/CR FY2011) for a new Science and Technology Center and \$13.8 million (+\$1.2 million over FY2010/CR FY2011) for CAREER. SEES funding through GEO will focus on clean energy and technologies to help mitigate and adapt to environmental changes. CAREER funds will support young investigators who exemplify the role of teacher-scholars through outstanding research and education. Please see the table for more details on investments in Geosciences at the National Science Foundation for FY 2012.

Tim Killeen, the Associate Director for the Geosciences (GEO) at NSF, said the agency has responded well to the fiscal year 2012 budget request. "We are delighted," he proclaimed. Programs of focus for GEO include SEES and two new programs: CIF21 and Creating a More Disaster Resilient America (CaMRA). The Earth Sciences arm of GEO (EAR) in particular will have a leadership role in SEES and in CaMRA, Killeen noted. A goal for SEES is to create research and education partnerships within government, academia, and the private sector, and EAR will be an essential contributor to energy studies on topics such as methane hydrates and carbon capture and sequestration. CIF21 aims to facilitate access to data and scientific instruments and facilities. CaMRA is a new initiative focused on improving forecasting and predicting natural and man-made hazardous events through basic research efforts in hazard-related science. It has been an idea in the making for a couple years, Killeen mentioned, and will center on gaining general knowledge on hazards. GEO will continue to invest in education and diversity to develop the future workforce, and ocean observatories, a new arctic research vessel (R/V SIKULIAQ) and the NCAR/Wyoming Supercomputing Center are all under construction.

GEO was forced to make cuts in some areas, admitted Killeen. The Oceanus, a research ship, is being retired, the Earth Surface Dynamics program will end, and NSF is ending support of the Cyber-enabled Discovery and Innovation (CDI) initiative. However, GEO is overall pleased with the situation. "This is mostly good news," Killeen explained. He admitted that it is hard to speculate on the results of possible cuts included in the House continuing resolution for fiscal year 2011, but said that in the 2012 budget NSF and GEO generally avoided major decreases. "The role of geosciences in the national economy...is deeply held within the foundation and the administration," he said.

NSF Director Suresh Outlines Vision for Fiscal Year 2012 Budget Request

Dr. Subra Suresh, Director of the National Science Foundation (NSF), held a briefing on Monday February 14 to discuss President Obama's fiscal year 2012 budget request. He explained his vision for NSF that will ensure the agency remains a leader for the 21st century, saying NSF must adapt to meet today's new challenges. With the budget request and the direction he has for the foundation, Suresh hopes to "accelerate NSF's role as a leader in catalyzing scientific activity." He plans to achieve these goals by focusing on increasing interdisciplinary research and approaches to science; improving NSF's ability to respond to rapid technology advances; and continuing NSF's commitment to science, technology, engineering and mathematics (STEM) education. Looking ahead, the agency is prepared for what Suresh described as an "Era of Observation" and an "Era of Data and Information." The focus on observation is clear, he said, considering the use of telescopes to find new planets and monitor changes in sea ice and the employment of new arctic research vessels to understand better our oceans and atmosphere in a rapidly changing planet. The CyberInfrastructure Framework for 21st Century Science and Engineering (CIF21) is NSF's keystone program that will focus on data integration, access and extraction. NSF will continue its investment in clean energy development and sustainability science with the Science, Engineering, and Education for Sustainability (SEES) program. Echoing President Obama's call for heavy investment in research and development, Suresh said we must "fuel America's innovation engine" to make advances and remain competitive on the global scale.

House Action

The Commerce, Justice and Science Subcommittee of the House Appropriations Committee completed a draft bill on July 7, 2011. The House Committee on Appropriations passed the Commerce, Justice, Science, and Related Agencies Appropriations Act, 2012 (H.R. 2596, House Report 112-169) on July 20, 2011.

Senate Action

The Senate Appropriations Committee passed the Commerce, Justice and Science fiscal year 2012 appropriations bill (S. 1572) on September 15, 2011. Below are excerpts from the press release of subcommittee Chairman Barbara Mikulski (D-MD). The full Senate passed S. 1572 as part of a "minibus" on November 1, 2011.

The U.S. Senate Appropriations Subcommittee on Commerce, Justice, science, and related agencies today approved fiscal year (FY) 2012 funding legislation that totals \$52.701 billion in discretionary budget authority, a reduction of \$626 million below the fiscal year 2011 enacted level. The bill also includes \$135 million in disaster assistance.

"In a spending bill that has less to spend, we naturally focus on the cuts and the things we can't do," said CJS Subcommittee Chairwoman Mikulski. "But I'd like to focus on what we can do. The bill invests more than \$12 billion in scientific research and high impact research and technology development, to create new products and new jobs for the future.

Text from Commerce, Justice and Science Subcommittee report 112-78 regarding geoscience-related facilities within NSF: *Support for Academic Research Fleet.—At a time of rising costs for fuel and material, the Committee is concerned about maintaining an adequate funding level for the Academic Research Fleet and related research to ensure vessels are properly maintained and effectively utilized. The Committee supports the full budget request level for Regional Class Research Vessels of \$2,000,000. Within 180 days of enactment of this act, NSF should report to the Committee on the status of planned acquisition of three vessels to provide regional capabilities in the Atlantic, Pacific, and gulf coast regions.*

Deep Underground Science and Engineering Laboratory [DUSEL].—The Committee notes the National Science Board's decision to end NSF involvement in DUSEL and appreciates transition funding provided in fiscal year 2011 to coordinate with the Department of Energy [DOE]. In light of the recent Board decision and National Research Council recommendations, the Committee expects NSF to provide a report within 60 days regarding efforts to collaborate with DOE on the use of a future deep underground science laboratory and any current or planned commitments by the Foundation.

Conference Committee Action

On November 15, the House Committee on Rules released the conference report agreed to by the House and the Senate for the "minibus" which includes the Agriculture, Rural Development, Food and Drug Administration and Related Agencies Appropriations Act, 2012; the Commerce, Justice, Science, and Related Agencies Appropriations Act, 2012; and the Transportation, Housing and Urban Development, and Related Agencies Appropriations Act, 2012 (H.R. 2112). The conference report for Commerce, Justice, Science, and Related Agencies includes appropriations for the National Oceanic and Atmospheric Administration, the National Institute for Standards and Technology, the National Aeronautics and Space Administration, and the National Science Foundation (NSF). Below are highlights of the conference report related to the NSF.

Research priorities. - The conferees appreciate NSF's commitment to reviewing its portfolio of programs and proposing reductions or terminations where appropriate. Such proposals provide a more fiscally sustainable way to support new or expanded programs. Accordingly, the conference agreement incorporates all of NSF's R&RA termination and reduction proposals except for the requested reduction to the radio astronomy program. By accepting NSF's proposal to eliminate funding for the Deep Underground Science and Engineering Laboratory (DUSEL), the conference agreement completes a multi-year phase-out of NSF involvement in this project. NSF is directed to report to the Committees on Appropriations about future efforts or

commitments, if any, to collaborate with the Department of Energy on a deep underground lab.

In discussing the Education and Human Resources Directorate (EHR), the conference wrote:

Program changes. - In parallel with terminations and reductions proposed in the R&RA account, NSF has proposed a number of program reductions or terminations within EHR. For the most part, these cuts were proposed not due to any dissatisfaction with the programs in question but rather because NSF would prefer to implement new initiatives. The conferees have no objection to this approach, with the exception of the proposed reductions to the Robert Noyce Scholarship Program and the Math and Science Partnership program. The conferees do not believe that those cuts are warranted solely to make room for new activities.

Broadening Participation at the Core. - The conference agreement adopts, by reference, language from the House report regarding funding levels for the existing Broadening Participation at the Core programs.

Best practices in K-12 STEM education. - NSF is encouraged to find more effective mechanisms for disseminating the results of its education research to the K-12 STEM education community. Such mechanisms could include partnerships with nonprofits and professional associations, webinars, newsletters and workshops, drawing when possible on the resources of existing networks.

In particular, NSF is directed to ensure that the NRC report entitled Successful K-12 STEM Education: Identifying Effective Approaches in Science, Technology, Engineering, and Mathematics is widely distributed within the educational and scientific communities. In addition, NSF is directed to begin work to identify methods for tracking and evaluating the implementation of the recommendations in the NRC's report. NSF and its collaborators should provide an evaluation plan to the Committees on Appropriations within 12 months of the enactment of this Act that describes these methods and recommends the necessary steps that should be taken by NSF and other Federal agencies to implement that plan. Within the amounts available in this account, up to \$500,000 should be used for the formulation of the evaluation plan.

Appropriations Hearings

- March 11, 2011: House Committee on Science, Space, and Technology Hearing on the Fiscal Year 2012 Budget Requests for the National Science Foundation and the National Institute of Standards and Technology
- March 10, 2011: House Committee on Appropriations Subcommittee on Commerce, Justice, Science, and Related Agencies Hearing on the Fiscal Year 2012 Budget Request for the National Science Foundation

House Committee on Science, Space, and Technology Hearing on the Fiscal Year 2012 Budget Requests for the National Science Foundation and the National Institute of Standards and Technology

March 11, 2011

Witnesses

Panel 1

Dr. Subra Suresh

Director, National Science Foundation

Dr. Ray Bowen

Chairman, National Science Board

Panel 2

Dr. Patrick Gallagher

Under Secretary of Commerce for Standards and Technology, and Director, National Institute of Standards and Technology
Committee Members Present

Ralph Hall, Chairman (R-TX)

Eddie Bernice Johnson, Ranking Member (D-TX)

Dana Rohrabacher (R-CA)

Zoe Lofgren (D-CA)

Roscoe Bartlett (R-MD)

Marcia Fudge (D-OH)

Sandy Adams (R-FL)

Donna Edwards (D-MD)

Mo Brooks (R-AL)

Hansen Clarke (D-MI)

Dan Benishek (R-MI)

Daniel Lipinski (D-IL)

Randy Hultgren (R-IL)

John Sarbanes (D-MD)

Benjamin Quayle (R-AZ)

The House Committee on Science, Space, and Technology held a hearing on March 11, 2011 to discuss the fiscal year (FY) 2012 budget requests for the National Science Foundation (NSF) and the National Institute of Standards and Technology (NIST). The morning of the hearing, an 8.9 magnitude earthquake occurred off the coast of Japan that caused tsunamis around the world, placing some topics of discussion in an immediately relevant, though tragic, context.

Chairman Ralph Hall (R-TX) opened the hearing by acknowledging both agencies for their “vital contributions to our nation’s competitiveness,” and he listed several achievements that have come from NSF investments, including *Google* and MRIs, and thanked NIST for “making things run smoothly.” However, Hall said, considering the nation’s financial condition, the budget requests and increases are not realistic. Hall expressed concern that the Obama Administration has placed a greater emphasis on applied research at the agencies, whose core missions are to fund basic, fundamental research.

Ranking Member Eddie Bernice Johnson (D-TX) applauded the agencies for presenting budgets that invest in science and innovation to help stimulate economic growth. She compared the requests to the Full Year Continuing Appropriations Act of 2011 (H.R. 1) that the House passed in February, which includes cuts to both agencies. In fact, Representative Johnson said she was “dumbfounded” that some were considering cutting investments that help reduce the national debt and create well-paying jobs. Dr. Patrick Gallagher, director of NIST, outlined the priorities of the NIST FY 2012 budget request. He described the initiatives included in the request that aim to bolster manufacturing, infrastructure and education in the U.S. Dr. Gallagher mentioned the importance of disaster mitigation in which NIST is engaged, specifically its responsibility of the National Earthquake Hazard Reduction Program (NEHRP). He acknowledged that the events in Japan serve as an unfortunate reminder of hazard reduction significance.

Representative David Wu (D-OR) expressed the importance of NIST research to develop more earthquake resistant buildings and structures to help communities become more resilient. He explained that the Cascadia subduction zone off the coast of Oregon has the potential for a magnitude 9.0 earthquake. Gallagher responded that the timeliness of the topic was tragic, and went on to describe the federal agencies that are critical to disaster reduction and response. He explained how the U.S. Geological Survey (USGS) is responsible for obtaining and producing seismic data and for mapping the areas in danger; the Federal Emergency Management Agency (FEMA) deals with response and recovery following a disaster; NSF invests in research for long-range engineering issues related to disasters; and NIST supports development of infrastructure and buildings that are resilient against earthquakes. This involves using research conducted by other agencies to develop model building codes that can then serve as an example and be adopted in local community codes. He stated that the NEHRP advisory committee is at NIST and told the committee that more research needs to be done on hazards mitigation.

Dr. Subra Suresh, director of NSF, highlighted some of the priorities included in the \$7.8 billion FY 2012 budget request. NSF plans to invest heavily in cyberinfrastructure, the Advanced Manufacturing Initiative, nanotechnology initiatives and three new science, technology, engineering and mathematics (STEM) education programs.

Dr. Ray Bowen, chairman of the National Science Board, added his support for the NSF budget request. He noted that investment in science, technology, infrastructure and the workforce are critical to America’s continual economic growth, and that Congress must not lose sight of “long term investment during near term challenges.”

Several questions related to STEM education programs. Ranking Member Johnson asked for an update on efforts to increase women and minority participation in STEM fields. Dr. Suresh said that though the number of women in higher education and those entering the workforce has increased in recent years, there is room for improvement for retaining them. Representative Hansen Clarke (D-MI) expressed concern about the proposed cuts to K-12 STEM education programs, in particular the termination of the Graduate STEM Fellows in K-12 Education (GK-12) program. Dr. Suresh assured him that NSF remains “very, very strongly committed” to K-12 education. Other STEM education programs will incorporate the best aspects of GK-12 in an attempt to streamline priorities, he said, and the elimination and reduced funding of the program in no way reflects a reduced commitment to improving STEM education. Noting that 12 federal agencies have roles in STEM education, Representative Dan Benishek (R-MI) asked whether it is necessary to have more than one agency working on the issue. Dr. Suresh stressed that NSF has the unique upstream role of researching, developing and testing models of the best teacher practices that other agencies then implement. He reminded Representative Benishek that NSF is the only federal agency that is involved in every science and engineering field.

There was varied response to the budget request. Representative Mo Brooks (R-AL) said it is “irresponsible for the White House to propose these increases” considering the country’s financial situation and asked Dr. Suresh what fields of research have the highest priority. Dr. Suresh noted that the FY 2012 budget outlines NSF’s priorities. He told him that NSF-funded research historically creates near and long term job opportunities and that innovation, the “engine of the economy,” is more important in an unstable economy than a thriving one. Representative Zoe Lofgren (D-CA) agreed that “when times are tough it’s time to double down on science investments.”

Talk turned to discussion of the Full Year Continuing Appropriations Act of 2011 (H.R. 1). Representative Lofgren told Dr. Suresh that research universities in California have warned her that the cuts included in the act would result in far fewer grants in science and technology fields, therefore “killing the future prosperity.” Dr. Bowen added that if the funding decreases, “there will be impacts” for long term fundamental research. He mentioned that young students and scientists beginning their careers in STEM areas would have fewer opportunities.

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**House Committee on Appropriations Subcommittee on Commerce, Justice, Science, and Related Agencies Hearing on the
Fiscal Year 2012 Budget Request for the National Science Foundation**

March 10, 2011

Witness

Dr. Subra Suresh

Director, National Science Foundation

Committee Members Present

Frank Wolf, Chair (R-VA)

Chaka Fattah, Ranking Member (D-PA)

Jo Bonner (R-AL)

Robert Aderholt (R-AL)

John Culberson (R-TX)

José Serrano (D-NY)

In the midst of budgetary uncertainty and tough financial times, the House Committee on Appropriations Subcommittee on Commerce, Justice, Science, and Related Agencies held a hearing on the fiscal year (FY) 2012 budget request for the National Science Foundation (NSF) on March 10, 2011.

Vice Chair Jo Bonner (R-AL) began the hearing by telling Dr. Subra Suresh, Director of NSF, that he was appearing before a subcommittee that is “very supportive of your agency.” Bonner spoke about increased international competition for the position as the world’s leading innovator and the difficulty of retaining this spot while dealing with a recovering economy. “NSF will play a key role,” he admitted, in furthering economic prosperity.

Calling for more support for NSF, Ranking Member Chaka Fattah (D-PA) said that the FY 2012 budget request of \$7.8 billion is a “poultry sum.” He compared it to the \$5 billion that the federal government of Singapore invests in its research and development, which equals 3% of its gross domestic product (GDP). Representative Fattah said the country must invest in its science and innovation capabilities to improve the economy and national security; otherwise, “we risk being pushed aside on this scientific superhighway,” he elaborated.

Dr. Suresh began his testimony by saying that he first came to the U.S. from India as a young engineering student because “it was the world’s beacon of excellence in science and engineering research and education.” To keep that status, the country needs to invest in innovation, technology and the development of a highly skilled workforce, upon which the nation’s economic competitiveness depends, he said. Suresh went over highlights of the NSF budget request, including investments in cyberinfrastructure; the Advanced Manufacturing Initiative; efforts to promote interdisciplinary research and education; and science, technology, engineering and mathematics (STEM) education programs.

Representative Bonner asked Dr. Suresh how the continuing resolution that is currently funding NSF is affecting the agency’s work. Suresh said that though NSF has continued plans to honor commitments to researchers, it is “constraining our ability” to take steps forward. He said that an unseen effect is the psychological impact on students, faculty and researchers across the country who are faced with uncertainty.

The budget request proposes increasing education allowances and stipends for fellowships of the Graduate Research Fellowship (GRF) program. Representative Bonner wanted to know whether this decision is better than the alternative of using that money to fund more awards. The increases are in response to higher costs of education and of living, answered Suresh, and he said that NSF will be able to maintain the number of GRF’s awarded.

Ranking Member Fattah asked Dr. Suresh what it would mean to the U.S. if other countries moved ahead in science and

innovation. Other countries, large and small, are funding their research and development agencies at levels much higher than the U.S., Suresh explained, and because of that, he worries that in the future the U.S. will not be regarded as the prime destination for budding scientists.

“There is a movement to cut, cut, cut, cut,” said Representative José Serrano (D-NY), referring to the current budgetary negotiations in the House and Senate. “What are we in danger of?” he asked, if federal science agencies like NSF and the National Aeronautics and Space Administration (NASA) see large decreases. Suresh explained that NSF keeps a focus on long term investments in basic science, which is the engine of innovation. “It will come back to hurt us,” he warned, if that focus is lost while trying to deal with problems in the short-term.

Members had concerns about the efficiency and fate of STEM education programs. Representative Bonner noted that a 2011 Government Accountability Office report found in existence 82 programs among 10 federal agencies whose goal was to improve STEM teachers. Suresh stressed that NSF has the unique upstream role of researching, developing and testing models of the best teacher practices that other agencies then implement. Chairman Wolf asked why the budget includes decreases in funding to STEM K-12 education programs, such as the Graduate STEM Fellows in K-12 Education (GK-12) program, which is set to be terminated. NSF spreads its STEM activities throughout the agency, explained Suresh, so there are programs that address STEM education concerns without explicitly saying so. GEO-Teach, a program within the Directorate for Geosciences (GEO) that trains geoscience teachers, is an example he gave. He assured the members that NSF will incorporate the best practices from terminated programs into its new ones and that the decrease in funding for STEM education in no way reflects a decreased commitment to improving it.

Representative Serrano inquired about STEM education programs to broaden participation of minorities. Dr. Suresh mentioned the programs at NSF that aim to do so and said the agency hopes to make progress on learning how to improve retention rates of underrepresented individuals, including women, who enter the workforce but do not remain for the long term.

Ranking Member Fattah voiced concern over finding a balance between access to scientific data and security of information, especially if it is sensitive for national security or economic gains. Suresh reminded the committee that science has always been an open-access field, which is good for knowledge creation and helps to broaden science and engineering participation globally. However, NSF is working to improve cybersecurity and is engaging in talks to convince international partners to practice openness. Chairman Wolf said that in 2009 he asked NSF to compose a report on the best K-12 STEM education practices and how to implement them. Suresh assured him that the agency is working on it and is set to have a preliminary report in June and a final report in July. Wolf said he wants the report to be “profound” and have a great impact on the education community. In turn, Fattah suggested and Wolf agreed to hold a highly publicized announcement of the results in Philadelphia upon completion. “We’ll get you a cheesesteak,” Fattah told Wolf.

Representative Bonner admitted that the U.S. does not put “near enough time and effort” on highlighting the achievements of scientists, especially compared to the publicity and attention given to athletes and celebrities. He suggested that NSF find ways to increase public outreach to convey the importance of the agency’s work on people’s daily lives. Suresh agreed, saying NSF is working on improving communication and data access to address such concerns.

Overall, a sense of urgency regarding America’s international position among the sciences permeated throughout the subcommittee. “I’m worried that this country is about to go into decline,” cautioned Chairman Wolf. All the members agreed that investing in science, technology and engineering is essential to economic security. Despite the nation’s austere financial situation, “we’re going to try to protect NSF,” said Representative John Culberson (R-TX).

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Sources: NSF Budget Information web site and Thomas

Please send any comments or requests for information to the AGI Government Affairs Program at govt@agiweb.org.

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