National Science Foundation Appropriations: FY 2014

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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.

FY14 NSF Appropriations Process

Account	**FY12 Enacted** ($million)	**President's FY14 Request** ($million)	**House Action** ($million)	**Senate Action** ($million)	**Conference Committee Action** ($million)
National Science Foundation (total)	7,033	7,626			
Research & Related Activities	5,689	6,212			
Geosciences Directorate	1,321	1,394			
Atmospheric and Geospace Sciences	259	267			
Earth Sciences	183.5	191			
Ocean Sciences	352	377			
Polar Programs	436	465			
Integrative & Collaborative Education & Research	91.2	93.7			
-- Seismological Facilities for the Advancement of Geosciences and EarthScope (SAGE)	26.8*	25.7			
-- Geodetic Facilities for the Advancement of Geoscience and EarthScope (GAGE)	13.2*	12.7			
-- Academic Research Fleet	77	85			
--National Astronomy and Ionosphere Center	8.7**	8**			

--National Center for Atmospheric Research	98.6	99			
-- International Ocean Discovery Program (IODP)	44.4#	50			
Major Research Equipment & Facilities (MREFC)	197	210			
--Ocean Observatories Initiative (OOI)	103^	27.5^			
Education & Human Resources	829	880			

*The Incorporated Research Institutions for Seismology (IRIS), EarthScope, and UNAVCO were integrated into the Seismological Facilities for the Advancement of Geosciences and EarthScope (SAGE) and the Geodetic Facilities for the Advancement of Geoscience and EarthScope (GAGE). SAGE will be operated by IRIS and GAGE will be operated by UNAVCO. The estimated FY2012 budget for IRIS was $12 million and for EarthScope operations was $25 million.
**Number is total budget for Arecibo Observatory from the Geosciences Directorate and the Mathematical and Physical Sciences Directorate. The National Aeronautics and Space Administration (NASA) is expected to provide $2 million in support for FY2014.
#FY2012 enacted value is for the Integrated Ocean Drilling Program which ends in 2013. FY2014 request is for the new 10-year International Ocean Discovery Program which begins in October 2013.
^Number does not include additional funding from the Geosciences Directorate which would add $26.8 million to FY2012 enacted and $52.8 million to FY2014 requested.

President's Request

President Obama's budget request for fiscal year (FY) 2014 was released April 10, 2013. The National Science Foundation (NSF) provides a breakdown of the FY2014 budget with regard to their programs.

House Action

The House of Representatives considers funding for NSF, NASA, NOAA and NIST in the Commerce, Justice and Science Subcommittee of the House Appropriations Committee.

Senate Action

The Senate considers funding for NSF, NASA, NOAA and NIST in the Commerce, Justice and Science Subcommittee of the Senate Appropriations Committee.

Appropriations Hearings

- April 17, 2013: House Committee on Science, Space, and Technology Hearing to Review the President’s FY 2014 Budget Request for Science Agencies
- April 17, 2013: House Committee on Science, Space, and Technology Subcommittee on Research Hearing: “An Overview of the National Science Foundation Budget for Fiscal Year 2014”

House Committee on Science, Space, and Technology Hearing to Review the President’s FY 2014 Budget Request for Science Agencies

April 17, 2013

Witnesses:

The Honorable John Holdren

Director, Office of Science and Technology Policy, Executive Office of the President

Committee Members Present:

Lamar Smith (R-TX), Chairman

Eddie Bernice Johnson (D-TX), Ranking Member
Dana Rohrabacher (R-CA)
Randy Neugebauer (R-TX)
Zoe Lofgren (D-CA)
Randy Hultgren (R-IL)
Daniel Lipinski (D-IL)
Bill Posey (R-FL)
Donna Edwards (D-MD)
Eric Swalwell (D-CA)
David Schweikert (R-AZ)
Elizabeth Esty (D-CT)
Randy Weber (R-TX)
Suzanne Bonamici (D-OR)
Mark Takano (D-CA)
Marc Veasey (D-TX)
Frederica Wilson (D-FL)

On April 17, 2013, the House Committee on Science, Space, and Technology held a hearing to receive testimony from the White House Office of Science and Technology Policy (OSTP) on President Obama's proposed fiscal year (FY) 2014 budget for science agencies, research and development (R&D), and science, technology, engineering, and mathematics (STEM) education.

Chairman Lamar Smith (R-TX) stated in his opening statement that the committee holds jurisdiction over "$40 billion in annual federal R&D spending," and that their "budget choices for federal R&D investments…will affect research and technology for many decades to come." He discussed questions facing the committee over how federal R&D investments should best be directed. He pressed the need for future "systems" to "launch American astronauts on American rockets," and for improved research onboard the International Space Station. He asked if the future of human spaceflight ought to lie in exploring asteroids or the Moon. Smith also noted the budget's proposed $2.7 billion for climate science projects at 13 agencies, inquiring if further consolidation is possible and how such a budget will "affect other research priorities."

In her opening statement, Ranking Member Eddie Bernice Johnson (D-TX) said, "I am pleased that the President remains committed to prioritizing investments in [R&D] and STEM education in his [FY 2014] request." She stated that "there are few more important investments we can make than in our nation's brain power." She praised the budget's "increased support for advanced manufacturing," the U.S. Global Change Research Program, and the National Aeronautics and Space Administration (NASA) "climate research." She approved of "the President's continued commitment to… sustained upward [budget] trajectories initiated in the America COMPETES Act" for the National Science Foundation (NSF), the National Institute of Standards and Technology (NIST), and the Department of Energy's (DOE) Office of Science. She noted that the above "agencies, among others, help to ensure our long-term economic growth through their support for cutting edge basic research and STEM education." Johnson discussed her "support" for creating "a coherent vision and strategy for federal investments in STEM" education, but expressed concern over "the release of this proposal before we have the strategic plan in hand." She requested that OSTP "prioritize getting us the full report" on the reorganization of federal STEM education programs.

John Holdren, director of OSTP for the Executive Office of the President, testified that President Obama supports "three overarching priorities" for science funding: "making America a magnet for new jobs and manufacturing; unlocking the promise of American energy; and educating our citizens with the skills and training to fill the jobs of the future." He stated that the FY 2014 budget proposes $142.8 billion for federal R&D (1.3 percent higher than FY 2012 enacted levels): $69.6 billion for non-defense R&D (9.2 percent increase), $71.5 billion for development ($3.8 billion decrease), $17.7 billion for NASA, $379 million for the Advanced Research Projects Agency –Energy (ARPA-E), $3.1 billion for federal STEM education (6.7 percent increase), and $13.5 billion for NSF, DOE's Office of Science, and NIST laboratories combined (8 percent increase). The NASA funding will, among other items, support "the continued development of the space launch system and the Orion Multi-Purpose Crew Vehicle to enable human explorations to new destinations" such as an asteroid. He discussed Obama's proposal to establish an Energy Security Trust to work on transitioning cars away from oil, and support for "several high level interagency science R&D initiatives including the Networking and Information Technology R&D program…and the U.S. Global Change program."

During the question and answer session, questions from Smith, Randy Weber (R-TX), and Bill Posey (R-FL) focused on potentially questionable studies NSF chose to fund in the social, behavioral, and economic (SBE) sciences. The representatives questioned how certain studies are justified, the priorities of the NSF in awarding funds, and if it would be beneficial to add phrasing to NSF's decision guidelines to require all approved studies enhance the nation's national security and economy. Posey stated that SBE studies cost NSF more than $250 million, with only $10 million going toward political science research. Additionally, the FY 2014 budget proposes a seven percent increase in SBE funding. Holdren noted examples of "valuable" and "good and important research" funded by NSF in SBE fields. Regarding titles given as examples of "questionable" studies, he stated "it is a perilous business, sometimes, to try to determine from the title of a grant or even from a description of it what value it might have as fundamental research." However, he acknowledged that "as rigorous as NSF's review processes are, there is always room for improvement." He cautioned that intervention may "undermine the basic research dimension" of NSF.

Posey voiced support for Senator Tom Coburn's (R-OK) amendment to the Consolidated and Further Continuing Appropriations Act, 2013 (P.L. 113-6) to require that "each and every social science study meets the criteria of promoting national security or economic interest" of the U.S. Holdren disagreed with the amendment claiming such language is "too narrowly drawn." He stated, "It's a dangerous thing for the Congress or anybody else to be trying to specify in detail what kinds of fundamental research the NSF should support" and "the private sector is not going to support basic research to the extent that society's interests require." He noted that it "is a responsibility of the government to fund basic research and…if you say that [a study] has to have a specific application, you're pulling the rug out from under the capacity of the NSF to fund basic research."

Questions from Johnson, Donna Edwards (D-MD), Frederica Wilson (D-FL), and Marc Veasey (D-TX) focused on the proposed reorganization of federal STEM education programs. Johnson noted that the proposal seeks to "better concentrate" 127 programs, but fails to provide a detailed plan. Holdren responded that the final plan would be available in May 2013. He noted that program consolidation would leave the Department of Education responsible for K-12 education, NSF for undergraduate and graduate

programs, and the Smithsonian for “engagement and outreach outside of schools.” He stated that “over 100 programs spread across the mission agencies” would remain “intact,” and that “a very serious effort” has gone into protecting “programs that most leverage the unique assets of the mission agencies” and “reach women and other underrepresented groups in STEM.” Additionally, NSF and the Smithsonian are “building up capacity” and the Department of Education is “expanding the staff that is dedicated to STEM education” to accommodate the reorganization.

Edwards noted problems in “informal” education programs where people at times “don’t know what makes a good program” and need more “guidance and coherence.” She asked if Holdren saw “a role for scientists on the ground to participate” in the new NSF and Department of Education programs. Holdren responded, “Absolutely yes,” and he highlighted some such programs. He noted that the reorganization affects “about half of the dispersed programs” and that the organizations that will take over – Smithsonian, NSF, and Department of Education – “are determined to continue to tap the expertise in the dispersed mission agencies for these purposes.”

Wilson voiced similar concerns, stating that “a lot of these hands on afterschool activities are what get very young children excited about science.” She asked Holdren to “elaborate on the new role of the Smithsonian in coordinating informal STEM education.” He outlined the goals that the Smithsonian plans to pursue: “co-creation” of program content with STEM agencies, development and maintenance of the infrastructure to deliver that content, establishment of “teachers and student agency partnerships,” and “evaluation of these efforts.” He argued that the Smithsonian is making a “well thought out effort” that “will build on and expand their existing efforts in these areas.”

Edwards also asked about continuing funding for basic research at “historically black colleges and universities and minority-serving institutions.” Holdren stated that OSTP “took care not to impact any programs connected with historically black colleges and universities or other programs that were explicitly focused on women or minorities in STEM,” and are reviewing any possible “indirect connections.”

Veasey raised the issue of employment in advance manufacturing and its connection to STEM education. He noted that in 2012 600,000 “highly advanced” and high paying manufacturing jobs “went unfilled largely because” many high school graduates lack specific skills and a sufficient background in STEM education to fill the positions. Holdren outlined a plan for addressing this workforce gap: change the “high school experience” to ensure that graduates are “better prepared for…high-skilled jobs” and “develop community college curricula” in concert with local industry partners “that prepares students for precisely the jobs that exist in the companies in their particular regions.”

Smith noted that there are 13 agencies working on climate science initiatives and asked, “Why not let NASA focus on its missions with regard to space?” Holdren responded that “NASA has long had a mission to planet Earth, a mission looking down as well as a mission looking out.” He stated that “NASA has unique capabilities” and “has long been a multi-mission agency.” Dana Rohrabacher (R-CA) noted that federal funding for the U.S. Global Change Research Program from 1990 to the end of 2013 amounts to $42 billion. He asked what research fields this program funds in addition to climate change. Holdren listed research in water, soils, desertification, deforestation, and oceans, but pointed out that “climate change has become such a pervasive phenomenon that it is linked in various ways with these other issues.” He noted that the “13 different agencies involved here” have “a wide variety of missions.”

Elizabeth Esty (D-CT) discussed the proposed Energy Security Trust which would apply “revenue from federal oil and gas development” to research into shifting away from the use of oil and toward “more secure alternatives.” She asked for more details on the Trust and if funds would be allocated to existing programs such as the DOE’s Office of Energy Efficiency and Renewable Energy and ARPA-E, or to new programs. Holdren stated that OSTP “envision[s] a variety of approaches including strengthening the support for some existing programs but providing support for some new opportunities.” He emphasized that the program is at an “early stage of formulation and we would expect to do it in consultation with the Congress.”

Esty also inquired about the reason behind the “substantial increase in the ARPA-E budget” proposed for FY 2014, and the projects it would fund. Holdren replied that APRA-E “has developed a strong reputation for thinking outside the box and for developing new ideas that can contribute substantially” to society. He noted advances in energy storage, advanced biofuels, and grid efficiency. He concluded that “money invested in ARPA-E has had a lot of leverage and so we’re proposing to expand it.”

Smith asked about the choice to invest in “capturing” an asteroid and drawing it closer to Earth to allow human exploration as opposed to pursuing more manned missions to the Moon. He pointed to the 2012 National Academy of Sciences report titled NASA's Strategic Direction and the Need for a National Consensus which showed more support among scientists for a lunar mission than one to an asteroid. Holdren responded that while there was initially a “lack of enthusiasm among some,” the creation of “an extraordinarily ingenious and cost effective approach to that mission” is generating “a lot of enthusiasm.” The new plan employs the Space Launch System and Orion Multi-Purpose Launch Vehicle as well as transporting the asteroid to a location that

NASA had already planned to visit.

-KAC

House Committee on Science, Space, and Technology Subcommittee on Research Hearing: "An Overview of the National Science Foundation Budget for Fiscal Year 2014"

April 17, 2013

Witnesses:

The Honorable Cora Marrett
Acting Director, National Science Foundation
The Honorable Dan Arvizu
Chairman, National Science Board

Committee Members Present:
Larry Bucshon (R-IN), Subcommittee Chairman
Daniel Lipinski (D-IL), Subcommittee Ranking Member
Lamar Smith (R-TX), Full Committee Chairman
Steve Stockman (R-TX)
Cynthia Lummis (R-WY)
Ami Bera (D-CA)

On April 17, 2013, the House Committee on Science, Space, and Technology Subcommittee on Research held a hearing to receive testimony on President Obama's proposed fiscal year (FY) 2014 budget for the National Science Foundation (NSF). Subcommittee Chairman Larry Bucshon (R-IN) posed the question in his opening statement, "What is the appropriate role of the Federal government in funding science research?" He said he hopes that through discussing that question the committee could "create a stronger, more efficient NSF, nimble enough to tackle the numerous scientific challenges of tomorrow." He questioned NSF's decision to fund certain grants, referring to the topics as "a nice luxury" to study but "not something that we need NSF to fund." He expressed strong support for mathematics, physics, chemistry, biology, engineering, cyber security, and STEM education funding. He asked people to "imagine the high-paying jobs that will result when today's basic scientific discoveries turn into tomorrow's marketable technologies." He voiced a need to "make sure that the NSF remains focused on its scientific goals and missions" and that taxpayer money is spent wisely.

In his opening statement, Subcommittee Ranking Member Daniel Lipinski (D-IL) noted that in a climate of budget cuts, Congress should focus on "increasing investments in areas that deliver real returns for taxpayers by improving our quality of life, protecting our population from natural and man-made threats, and ensuring our economic competitiveness." He stated that he was "pleased" with the FY 2014 budget request's support of science, innovation, STEM education, the NSF, advanced manufacturing, and the I-Corps program which fosters interaction between scientists and entrepreneurs and helps scientists identify "viable commercial products from their research." He discussed additional proposals supporting big data, the Integrated NSF Support Promoting Interdisciplinary Research and Education (INSPIRE) program, open access to federally funded research, the Major Research Equipment and Facilities Construction (MREFC) projects, and the Large Synoptic Survey Telescope. He expressed concern that budget uncertainty "has hurt scientific progress," noting that because "the agency and universities can't plan, some of the best and brightest give up and leave their labs, and the younger generation sees what their mentors are up against and choose a different path altogether." He noted that many questions in the hearing would focus on the proposed reorganization and consolidation of STEM education programs.

Full Committee Chairman Lamar Smith (R-TX) delivered an opening statement in which he asked, "How can the NSF better prioritize which areas of science and engineering it supports?" He stated, "In my view, the NSF has funded several studies that should not have been approved; however, I do not think that we should pick winners and losers by micromanaging grant decisions at the NSF." He noted a need to focus on studies that "benefit the taxpayers" and ensure "accountability and transparency" with regard to NSF operations and grant funding. He voiced support for NSF as having a "great potential to help American science flourish and thus contribute to our economy and the well-being of our country."

Acting Director of the National Science Foundation Cora Marrett stated in her testimony that "NSF is the only federal agency dedicated to the support of basic research and education in all fields of science and engineering." She noted that the FY 2014 budget request increases NSF's funding by $500 million (from FY 2012 levels) to $7.6 billion. According to Marrett, 94 percent of

that budget is applied “directly in support of research, education, and scientific infrastructure,” while only six percent goes to administrative costs. She emphasized NSF’s role in providing “the world’s gold standard for science funding,” which translates into a “history” of “leading edge discovery and innovation,” and investments in STEM education to ensure a future STEM workforce. She indicated that “NSF will support the efforts of almost 340,000 researchers, post-doctoral fellows, teachers, and students.”

Dan Arvizu, chairman of the National Science Board, began his testimony stating, “For over 60 years NSF has seeded our innovation ecosystem by funding the transformative research that underpins long term scientific and technological progress.” He noted that 60 percent of the nation’s research and development (R&D) funding comes from private businesses, but “only five percent of that goes to basic research.” Federal funding, therefore, “plays a critical complementary role” to industry by funding over 50 percent of the nation’s basic research. The FY “2014 budget request reflects a strategic commitment to supporting the best basic research, economic growth, job creation through innovation, and globally competitive science and engineering workforce.” He asked for “support for full funding of the NSF’s Agency Operating and Award Management Account.” He voiced concern over the FY 2013 restriction on political science funding, stating that these strictures could undermine the merit review process and progress of science. He noted that the “board is unanimous, and believes very strongly that legislatively imposing restrictions on a class of research can run significant risks in not serving the national interest.”

Lipinski and Smith inquired primarily about NSF’s role in funding social, behavioral, and economic (SBE) and political science studies. Lipinski asked about the “value” of these studies and why NSF should fund them. Marrett noted that, of NSF’s $7 billion budget, over $259 million is applied to SBE fields. She argued that “science” is defined by following a certain “approach,” and that SBE studies apply that approach and are considered scientific and warrant funding. She noted that these studies play a valuable role in “attracting” youth interest in these fields. Smith asked for recommendations to help “discourage approval of grants that don’t benefit the American people,” especially “when only one out of seven grants" is approved. He listed a couple titles of studies that he disapproved of NSF funding. Marrett responded that there is a “distinction” between the title of a project and its potential benefits which “may not be clear” from the onset. Arvizu noted that adding more requirements to the grant selection process so as to limit the types of projects receiving awards would “compromise the integrity” of the NSF.

Bucshon asked if the $2.5 million “reserved” for work on making open access to federally funded research a reality was sufficient to accomplish this goal. Marrett stated that it was “not enough” and that the $2.5 million only goes toward agency planning efforts.

-KAC

Sources: NSF Budget Information web site and Thomas

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