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National Science Foundation

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HIGHLIGHTS

- The proposed FY 2015 budget for the National Science Foundation (NSF) is \$7.255 billion. This is an increase of \$83 million, or 1.2 percent above the FY 2014 estimated amount of \$7.172 billion.
- In addition to the \$7.255 billion base budget, the Administration proposed an additional \$552 million in funding for NSF through the “Opportunity, Growth, and Security Initiative (OGSI).” House and Senate Appropriations Committee members have stated their intentions to adhere to the spending caps set in the Bipartisan Budget Act of 2013, and thus will likely reject additional funding through the OGSI proposal.
- The FY 2015 budget includes the following accounts:
 - **Research and Related Activities (R&RA):** the request is \$5.807 billion, a reduction of \$1 million below the FY 2014 estimated amount of \$5.809 billion;
 - **Education and Human Resources (EHR):** the request is \$890 million, an increase of \$43 million above the FY 2014 estimated amount of \$847 million;
 - **Major Research Equipment and Facilities Construction (MREFC):** the request is \$201 million, which is a slight increase of \$1 million above the FY 2014 estimated amount of \$200 million.
- In its budget, NSF has highlighted specific agency priorities. These include: Advanced Manufacturing; Clean Energy; Innovation Corps (I-Corps); the National Robotics Initiative; and Biological, Mathematics, and Physical Sciences (BioMaPS).

– Agency-wide initiatives include Cognitive Science and Neuroscience; Cyber-Enabled Materials, Manufacturing and Smart Systems; Science, Engineering, and Education for Sustainability; and Cyber-infrastructure Framework for the 21st Century Science and Engineering.

AGENCY OVERVIEW

The 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..."¹ Since its creation, NSF has played a critical role supporting fundamental research and education across all disciplines of science.

Over three-fourths of NSF's budget goes to support research at colleges and universities. The agency provides 24 percent of all support for basic research at U.S. academic institutions. This share increases to 60 percent when excluding NIH biomedical research support. In many fields, NSF is the dominant source for academic support. For example, NSF provides 87 percent of federal support for basic research in computer science, 66 percent in biology, 60 percent in the environmental sciences, 59 percent in mathematics, and 55 percent in the social sciences.

Approximately 90 percent of NSF funding is allocated as competitive awards, most of which are in the form of grants or cooperative agreements. In FY 2015, NSF expects to evaluate over 51,600 proposals and make over 11,400 new awards. To accomplish this, the Foundation expects to conduct over 233,000 proposal reviews using its merit review process and to engage between 40,000 and 50,000 reviewers from the science and engineering community. In FY 2015, NSF expects more than 305,900 people will be involved in its research and education programs, including 45,600 senior researchers, 6,260 postdoctoral associates, 44,000 graduate students, and 30,300 undergraduates. The agency also supports national research centers, user facilities, oceanographic vessels, and Antarctic research stations.

RECENT NSF CONGRESSIONAL ACTIVITY AND FUTURE OUTLOOK

At the beginning of the 113th Congress, the House Science, Space, and Technology Committee – which authorizes NSF and its programs – saw a leadership change with former Chair Ralph Hall (R-TX) stepping down

¹ National Science Foundation Act, P.L. 81-507

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and Lamar Smith (R-TX) assuming this role. Eddie Bernice Johnson (D-TX) maintained her role as Ranking Member of the Committee. In the Senate, the NSF authorization committee is the Commerce, Science, and Transportation Committee, which is chaired by Jay Rockefeller (D-WV) with John Thune (R-SD) serving as the Ranking Member. Meanwhile, funding for NSF is appropriated in the House and the Senate by the Commerce, Justice, Science and Related Agencies (CJS) Subcommittees. The CJS Subcommittee is chaired by Frank Wolf (D-VA) in the House and by Barbara Mikulski (D-MD) in the Senate, with Rep. Chaka Fattah (D-PA) and Senator John Thune (R-SD) serving as the ranking members.

With the America COMPETES Act of 2010 expiring, a key focus of the House and Senate NSF authorizing committees will be to pass new authorization legislation for the NSF before the 113th Congress adjourns. While past America COMPETES bills calling for doubling NSF funding over a 7-10 year period have enjoyed strong bipartisan support in the Senate, this was not true for the 2010 bill in the House, where a majority of Republicans voted against the bill. Therefore, getting an authorization bill for NSF approved by the House with any major funding increases authorized for the agency is likely to be very difficult.

While the Senate Commerce Committee held a hearing on reauthorizing the America COMPETES Act in November 2013, they have not begun to consider specific America COMPETES legislation. The House Science Committee has, however, begun to act on legislation called the Frontiers in Innovation, Research, Science, and Technology (FIRST) Act, which would reauthorize funding and programs for NSF, NIST, and OSTP. The bill as marked up by the Subcommittee on Research and Education would provide an overall 1.5 percent increase in funding for NSF over FY 2014 funding levels. The current bill has met opposition from the higher education and scientific communities due to the relatively low funding it proposes for the agency, and the fact that it authorizes specific funding levels for NSF at the directorate level, which would cut over \$50 million in funding from current FY 2014 funding levels from the Social, Behavioral and Economic Sciences Directorate and \$33 million from the Geosciences Directorate. The FIRST Act has also been criticized for additional policy proposals it includes which some in the university and broader research community believe will alter NSF's peer review process, are duplicative and unnecessary, and will impede the Foundation's ability to operate effectively and efficiently.

While the FIRST Act debate in the House Science Committee has been somewhat contentious, there still appears to be strong bipartisan support for NSF and its work among the leadership of the House and Senate CJS Appropriations Subcommittees. During a recent hearing of the House subcommittee, Chairman Frank Wolf noted that, “The subcommittee is a big supporter of basic research,” while Ranking Member Fattah stated, “We are very supportive of the foundation and its work.”

Chairman Wolf, who has long been a strong champion for NSF, has announced that he will not be running for another term in Congress, which leaves questions as to who will assume the role of Chair next year and if they will be as supportive of NSF. Of course, even despite this strong support, given the extreme fiscal constraints under which Congressional Appropriators will have to operate due to the budget agreement reached last year, achieving any significant funding increase for the NSF above the proposed funding included by the President in his budget proposal will be extremely difficult.

NSF’S FY 2015 BUDGET REQUEST

The President has proposed \$7.255 billion in overall funding for NSF in FY 2015. This is an increase of \$83 million, or 1.2 percent above the FY 2014 funding level of \$7.172 billion. More specific details concerning how this overall funding level breaks down are included below.

Research and Related Activities (R&RA): The budget request is \$5.807 billion, representing a very slight reduction in funding from the FY 2014 level of \$5.809 billion. Within R&RA, specific NSF directorates are provided with the following funding levels:

Biological Sciences (BIO): The FY 2015 budget for BIO is \$709 million, a decrease of \$13 million, or 1.8 percent below the FY 2014 level of \$721 million. BIO provides 66 percent of federal funding for non-medical basic research at academic institutions. For FY 2015, BIO will continue to support five grand challenges: (1) synthesizing life-like systems (Bio-MaPS); (2) understanding the human brain; (3) predicting an organism’s characteristics based on DNA sequencing; (4) supporting the National Ecological Observatory Network (NEON); and (5) understanding biological diversity.

Computer and Information Science and Engineering (CISE): The FY 2015 budget for CISE is \$893 million, a slight decrease of \$1 million, or

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0.1 percent below the FY 2014 level of \$894 million. CISE continues to be the principal federal funder of university-based research in computer science, accounting for 87 percent of federal support in this area. CISE will continue to lead the multi-agency Networking and Information Technology Research and Development (NITRD) program. Likewise, the directorate will maintain its leadership position in the Cyber-enabled Materials, Manufacturing, and Smart Systems (CEMMSS) initiative.

Engineering (ENG): The FY 2015 budget for ENG is \$858 million, which is an increase of \$7 million or 0.8 percent above the FY 2014 level of \$851 million. ENG provides 37 percent of federal funding for the engineering research conducted at academic institutions. While the directorate will continue to be a strong and essential participant in agency-wide initiatives, such as the Advanced Manufacturing Partnership and the National Nanotechnology Initiative, it will also continue to invest in core research programs such as flexible bioelectronics and nanotechnology safety.

Geosciences (GEO): The FY 2015 budget for GEO is \$1.304 billion, a slight increase of \$1 million, or 0.1 percent above the FY 2014 level of \$1.303 billion. GEO remains a principal source of funding for academic research by providing 64 percent of the total research in this area. As the primary supporter of basic scientific research in the polar region, GEO will continue its leadership of and participation in the Interagency Arctic Research Policy Committee.

Mathematical and Physical Sciences (MPS): The FY 2015 budget for MPS is \$1.296 billion, a decrease of \$4 million, or 0.3 percent below the FY 2014 level of \$1.3 billion. MPS provides 46 percent of federal funding for basic mathematical and physical science research at academic institutions. In FY 2015, MPS will continue to support disciplinary and interdisciplinary research in the following fields of study: astronomical sciences, chemistry, materials research, mathematical sciences, and physics.

Social, Behavioral, and Economic Sciences (SBE): The FY 2015 budget for SBE is \$272 million, an increase of \$15 million, or 6 percent above the FY 2014 level of \$257 million. SBE provides 55 percent of federal funding for basic social science research at academic institutions. In addition to playing an integral role in interdisciplinary research across the agency, SBE is the sole support for research in several scientific

fields of study, including economics, psychology, sociology, geography, neuroscience, archeology, political science, linguistics, and statistics.

International and Integrative Activities (IIA): The budget for IIA is \$474 million, a decrease of \$8 million, or 1.6 percent below the FY 2014 level of \$482 million. In FY 2015, IIA will provide funding for a diverse array of activities, including: \$160 million for the Experimental Program to Stimulate Competitive Research; \$167 million for Graduate Research Fellowships; and \$75 million for Major Research Instrumentation.

Education and Human Resources (EHR): The FY 2015 budget for EHR is \$890 million, which is a robust increase of \$43 million over the FY 2014 level of \$847 million. EHR consists of four divisions: Human Resource Development; Research on Learning in Formal and Informal Settings; Undergraduate Education; and Graduate Education.

Human Resource Development (HRD): The FY 2015 budget for HRD is \$143 million, a very small increase of \$1 million or 0.7 percent above the FY 2014 level of \$142 million.

Research on Learning in Formal and Informal Settings (DRL): The FY 2015 budget for DRL is \$242 million, an increase of \$11 million, or 4.9 percent above the FY 2014 level of \$230 million.

Division of Undergraduate Education (DUE): The FY 2015 budget for DUE is \$242 million, an increase of \$27 million, or 12.4 percent above the FY 2014 level of \$215 million. The FY 2015 budget continues NSF's longstanding support for undergraduate STEM education and teaching

In FY 2014, the National Science and Technology Council Committee on Science, Technology, Engineering, and Mathematics Education (CoSTEM) identified undergraduate STEM education as a priority in its 5-Year Federal STEM Education Strategic Plan. In response to the CoSTEM report, as well as earlier STEM education reports issued by the President's Council of Advisors on Science and Technology, the Administration attempted to consolidate STEM education programs across the federal government in FY 2014. The Administration's proposal was met with concern by Members of Congress and the general public. As a result, the Administration's proposed STEM consolidation plan was not enacted last year.

While the FY 2015 budget does not include a broad STEM consolidation plan, it does reorganize programs within NSF's undergraduate division,

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merging existing programs into one new program called “Improving Undergraduate STEM Learning (IUSE).” The FY 2015 budget for IUSE is \$99 million. IUSE will include the following programs: the STEM Talent Expansion Program (STEP), the Widening Implementation and Demonstration of Evidence-based Reforms (WIDER), and the Transforming Undergraduate Education in STEM (TUES). It is important to note that STEP, WIDER, and TUES were pre-existing programs that are now being housed under the IUSE program.

Division of Graduate Education (DGE): The FY 2015 budget for DGE is \$263 million, an increase of \$4 million, or 1.6 percent above the FY 2014 level of \$259 million. This increase in the DGE budget will allow for an increase in funding for the Graduate Research Fellowship program (GRF) and the NSF Research Traineeship program (NRT). DGE will fund GRF at \$166.7 million, an increase of \$16.7 million over the FY 2014 level of \$150 million. NRT will be funded at \$28 million, an increase of \$2 million over FY 2014.

NOTE: Both the GRF and NRT programs are funded by Research and Related Activities (R&RA) and the Education and Human Resources (EHR) Directorates. Thus, the total amount of funding requested in the budget for GRF is \$333 million (\$162.7 million from both R&RA and EHR). The total amount requested for NRT in the FY 2015 budget is \$58 million (\$29 million from R&RA and \$28 million from EHR).

Major Research Equipment and Facilities Construction (MREFC): The FY 2015 budget is \$201 million, a modest increase of \$1 million above the FY2014 level of \$200 million. The FY 2015 budget includes funding for the Daniel K. Inouye Solar Telescope (\$25 million), the Large Synoptic Survey Telescope (\$79.6 million), and the National Ecological Observatory Network (\$96 million).

NSF PRIORITIES AND AGENCY-WIDE INITIATIVES

The FY 2015 NSF budget includes several key priorities and agency-wide initiatives. Included among the key priorities are:

Advanced Manufacturing: The request is \$150.7 million. For FY 2015, NSF will focus its investment on “cyber-physical systems, advanced robotics research, scalable nano-manufacturing, sensor and model-based smart manufacturing, and educational opportunities to train the next generation of product designers and engineers.”

Clean Energy: The request is \$361.9 million. For FY 2015, NSF will invest in “research related to sustainable science and engineering, such as the conversion of storage and distribution of diverse power sources (including smart grids).”

Innovation Corps: The request is \$24.8 million. For FY 2015, NSF will continue to support I-Corps Nodes and I-Corps Sites, which are intended to help campus-based researchers commercialize NSF-funded scientific discoveries. The overall goal is to develop and nurture a “national innovation ecosystem.”

National Robotics Initiative: The request is \$28.5 million. NRI is an interagency program supported by NSF, NASA, NIH, and the USDA. The agencies will work in concert to develop the next generation of robotics for manufacturing, space, undersea exploration, healthcare, and military and homeland surveillance.

Biological, Mathematics, and Physical Sciences (BioMaPS): The request is \$29.2 million. BioMaPS is a collaborative effort among the Biological Sciences, Mathematical and Physical Sciences, and Engineering Directorates. The purpose of this program is to discover fundamental knowledge at the cross-section of these established disciplines.

Major agency-wide initiatives funded in the FY 2015 NSF budget include:

Cognitive Science and Neuroscience: \$29 million, an increase of \$15 million over the FY 2014 estimated level of \$13.8 million.

Cyber-Enabled Materials, Manufacturing and Smart Systems: \$213.2 million, a reduction of \$16.8 million from the FY 2014 level of \$230 million.

Science, Engineering, and Education for Sustainability: \$139 million, a reduction of \$22.7 from the FY 2014 estimated level of \$161.7 million.

Cyber-infrastructure Framework for the 21st Century in Science, Engineering, and Education: \$124.7 million, a decrease of \$20.6 million below the FY 2014 level of \$145.4 million.