

TITLE II--NATIONAL SCIENCE FOUNDATION

Section 211--Definition of STEM

For the purposes of Title II of this Act, the term `STEM' should be understood to be an umbrella term that covers every academic discipline and research area supported across the entire Foundation, including discipline based education research. Where the term `STEM' is used elsewhere in this Act, it is likewise meant to cover all disciplines supported by the relevant agency, or in the case of the PCAST and NSTC committees established in Title III, STEM should be understood to encompass the entire breadth of Federally supported research areas.

Section 214--Broader impacts review criterion

The Committee understands that the purpose of the broader impacts review criterion, first applied by NSF in the mid-1990's, is to increase the impact of NSF supported research on individual and societal well being. The Committee applauds the National Science Board for having recommended a broader impacts review criterion, and believes it should be applied across more agencies than just NSF. The specific list of goals in subsection (a) was included in a report to Congress by the Foundation in 2008, as requested in the 2007 America COMPETES Act. The Committee chose not to amend that list developed by the Foundation in 2008. However, the Committee understands that this list may and perhaps should evolve over time, and does not intend to preclude the National Science Board from launching a more in-depth, comprehensive review of either the goals or implementation of the Foundation's merit review criteria.

However, the Committee is concerned that this criterion has been in place for more than 10 years now with little effort put toward evaluation of its impact or toward holding anyone, including NSF funded investigators, accountable for their efforts to satisfy the criterion. The Committee understands that these same concerns have been echoed widely by stakeholders, including during NSF hosted workshops on this topic. The Committee believes that if a broader impacts review criterion is to be applied at all, it should be treated with the same rigor as the scientific merit review criterion. The intent of Sec. 214 is ensure such rigor, not by putting more burden on the individual investigators, but by putting more burden on the institutions and other organizations with expertise to assist individual investigators in achieving the goals of the review criterion. The Committee also encourages partnerships among institutions of higher education, and between institutions and other organizations, such as science museums, with expertise and resources to help investigators achieve one or more of the broader impacts goals.

While, to the extent practicable, investigators and institutions should employ evidence-based strategies and models to meet the chosen goal(s) of the broader impact criterion, as described in subsection (b)(2), the Committee does intend to leave room for innovation within the broader impacts portion of a proposal. This is particularly applicable to very large grants, such as Centers grants, and awards such as the CAREER awards that explicitly integrate education and research. Regarding Centers, the Committee has heard concerns that for such large grants, the researchers are too often disconnected from the education/outreach component, which may be overseen by separate staff. The Committee encourages the Foundation and the awardees to put more effort into integrating education and research efforts across all grants.

Section 216--Collection of data on demographics of faculty

The Committee intends for the Foundation, to the extent practicable, to use existing faculty demographic data sources and survey mechanisms utilized by other Federal agencies, including data collected and maintained by the National Center for Education Statistics at the Department of Education. Furthermore, the Committee does not expect institutions of higher education to have to report duplicative faculty demographic data to multiple Federal agencies, but instead expects the Foundation to work cooperatively with appropriate Federal statistical agencies to acquire such data.

Section 224--Strengthening institutional research partnerships

The Committee has been hearing for years that institutions with significantly less research capacity than the major research universities, especially minority serving institutions, are too often added to proposals as an afterthought by the lead university to make the proposal appear stronger with respect to satisfying the broader impacts review criterion. This practice is shortsighted and not in keeping with the purpose of such partnerships or the broader impacts review criterion. The Committee expects that any partnership funded by NSF be a true partnership that engages all players in the development and shaping of the proposal from the beginning. That does not mean the budget or research activities have to be split evenly among partner institutions; it simply means that both the needs and the unique strengths of the secondary institutions should be respected and taken into account in the development of the proposal. While it is not a research partnership, the Committee points to the astronomy bridge program between Fisk University and Vanderbilt University as an example of the kind of mutually beneficial partnership that should be emulated across all NSF funded partnerships.

Section 226--Support for research infrastructure

The range of 24-27 percent cited in this provision is meant to capture the entire breadth of research infrastructure funding at the Foundation, including MREFC, all of the maintenance and operations costs for MREFC projects being supported by the research directorates, cyberinfrastructure, major research instrumentation (MRI), and the several national centers and mid-scale facilities supported by the Foundation, such as the National Center for Atmospheric Research.

Section 227--Partnerships for innovation

The Committee understands that Partnerships for Innovation is currently undergoing review and likely to be re-envisioned through workshops and other activities that solicit stakeholder input on how to make the program most effective. The committee intends the language included in the bill to be flexible enough to allow the program to evolve, while maintaining key components, such as strong partnerships between and among institutions of higher education and industry, and building the capacity of colleges and universities and their researchers to transfer the knowledge they create into jobs and into improved social and economic well being for their regions and for the Nation. The Committee intends for the term 'social enterprise non-profit organizations' to refer to non-profit social entrepreneurial ventures harnessing the power of technology for social

benefit, for example a non-profit organization that develops specialized technologies for the disabled.

Section 228--Prize awards

The Committee recognizes that an innovation inducement prize program falls outside the Foundation's current experience for supporting basic research. However, the Committee believes that such a program is just one more tool to stimulate high-risk research that could potentially lead to transformative advances with far-reaching benefits for society. The Committee established this program as a pilot program to provide the Foundation with the opportunity to learn from the program and report back to Congress before the Administration or Congress decides whether to broaden it to a permanent program within the Foundation. Subject to availability of funds, the Committee expects the Foundation to hold more than one competition under this pilot program, and ideally 3-5 competitions so that the agency gains enough experience to make evidence-based recommendations on whether and how to proceed with such a program in the long term.

The Committee intends the language in subsection (g)(4) to prevent so-called 'double-dipping' into Federal funds. In other words, the Committee intends for an eligible researcher to pursue the research specific to the prize topic on his or her own time and without Federal funds. The Committee does recognize the incremental nature of science, and does not intend to exclude from eligibility a researcher who has used Federal funds to contribute to a body of knowledge upon which the prize-winning research is built, provided that he/she has not received a Federal research grant to carry out the specific research for which the prize is being awarded and is not diverting funds from a current Federal grant that was awarded for a related, but different research question. The same shall be true for any undergraduate or graduate student with a current (at the time of the prize announcement) Federal scholarship, fellowship, or research internship to pursue the specific area of research for which the prize is being awarded. A researcher who may have previously received such a scholarship, fellowship or internship in another researcher's laboratory may be eligible provided the other criteria described here are met.

Section 241--Graduate student support

The Committee chose to tie the growth of the IGERT program to that of the GRF program because our effort to achieve the same goal through provision of separate authorization levels for each program in the 2007 COMPETES Act went unheeded. The IGERT program has been flat-funded for 2 years now, and the Committee is concerned that the Administration will maintain this trend in coming years. The Committee does not intend for either program to cut into the many other valuable programs in the EHR budget, however the Committee continues to support the role of EHR in managing and maintaining budgets for both of these graduate programs.

In subsection (d), the Committee raises the cost of education allowance for graduate fellowships and scholarships from the current level of \$10,500 to \$12,000. However, for any case in which the cost of education at an institution is less than \$12,000, the Committee expects that the difference will be applied toward other allowances under the fellowship, including the stipend

and any additional allowance that may be included as a standard allowance for all fellows under the GRF or IGERT programs.

Section 242--Postdoctoral Fellowship in STEM education research

The Committee encourages the Director to award STEM education research fellowships under this section with consideration given to how the research to be supported is coordinated with the broader science education community and contributes to the systematic accumulation of knowledge on STEM education.

Section 243--Robert Noyce Teacher Scholarship program

As it recommended in 2007, the Committee continues to expect that the preponderance of the funds for this program will go directly to participants in the form of scholarships and stipends. But the Committee also understands that a significant percentage of the funds should be used in capacity-building activities, as defined in the 2007 Act. The Committee also understands that the resources needed to initiate a teacher education program may exceed the level needed for steady state operation of the program. The Committee expects that NSF will ensure that resources are allocated under the program to ensure a sufficient investment in capacity-building activities, so that the program does not merely hand out scholarships and stipends but rather reforms the way teachers are educated.

Since requiring the non-Federal matching requirement under Section 10A of Noyce in 2007, the Committee has learned that a number of institutions have provided up to 98 percent of the match with in-kind resources. While the Committee recognizes the need to provide flexibility to institutions in meeting the match, including the reduced match provided for under this Act, the Committee intends for a majority of the non-Federal match to be met in cash, except in the cases of small planning grants funded under this program.

Section 245--Institutional Integration

The language in this section is based on the Foundation's new I 3 program, and is consistent with the common theme of institutional transformation that cuts across this entire Title. While proposals may be focused entirely on integrating large EHR projects at an institution, the Committee also encourages the Foundation to solicit proposals that seek to institutionalize education and broadening participation efforts that may initially be funded through other NSF grants, such as Centers grants and CAREER awards.

Section 248--Transforming Undergraduate Education in STEM

The Committee intends that in cases for which consortia of institutions apply for a grant focused on reform in a single discipline across multiple institutions, and the relevant disciplinary society serves as the convener of the consortia, that society, provided it is otherwise eligible for NSF grants, may serve as the fiscal agent on the grant.

Section 249--21st Century graduate education

The Committee is supportive of NSF's GK-12 program, which provides graduate students in STEM with the opportunity to broaden their skills and translate their science for K-12 students and teachers, and understands that it has received very positive reviews. However, the Committee believes that there are many activities that could strengthen and broaden the graduate student experience and ensure that such students are prepared for diverse careers that utilize their STEM degrees. Therefore, it is the intention of the Committee that over the next few years, the budget for the GK-12 program, and the program itself, be captured by this broader initiative in graduate education.

The Committee recognizes the importance of master's programs to prepare future science professionals for careers in the business, government and non-profit sectors and intends that proposals to implement or expand innovative professional science master's degree programs remain eligible for funding under this section.

Section 250--Undergraduate Broadening Participation program

In Sec. 7033 of the 2007 America COMPETES Act, the Congress authorized a program to enhance the quality of undergraduate STEM education at Hispanic-Serving Institutions (HSIs) and to increase the number of Hispanic students receiving associate's and baccalaureate degrees in STEM, as well as the number of Hispanic students continuing on to pursue graduate studies in STEM. The Committee understands that the Foundation needed time to hold workshops and solicit community input on how to shape such a program to make it most effective for its intended purposes, and is now carrying out a comprehensive review of its entire portfolio of undergraduate broadening participation programs. However, it remains the intention of the Committee that the Foundation award grants that take into account the unique needs and challenges of Hispanic students pursuing STEM studies at those institutions and that allow HSIs to shape the proposals to meet their own institutions' and students' needs in order to achieve the goals of Sec. 7033 of the 2007 Act.

The Committee expects any plan by NSF to realign or consolidate existing undergraduate broadening participation programs to be developed in full consultation and collaboration with all affected communities and institutions.

TITLE III--STEM EDUCATION

Section 303--STEM education at the Department of Energy

The Committee intends for this section to provide guidance to the Department of Energy on the development of a vision and strategy for the role of the Department in contributing to STEM education, including energy sciences and engineering education, at all levels, both to address the Department's own workforce needs, and to contribute more broadly to improving the state of STEM education in the United States. Furthermore, the Committee is concerned about the lack of intra-agency coordination of STEM education activities at the Department. Therefore, the Committee calls for the appointment or designation of a Director of STEM Education, responsible for overseeing and coordinating all activities in support of STEM education at the Department. The Secretary may choose to house this person organizationally within the Office of

Science, but the Committee intends for the Director to be given responsibility to advise on and coordinate all STEM education matters and activities across the Department, including those funded by the applied energy technology offices. It is preferable that colleges and universities have a single portal through which to seek information regarding and funding from the Department's education programs. Finally, while the Committee recognizes and supports the need for the applied energy technology offices and their respective National Labs to develop stronger collaborations with universities, the Committee urges the Department to take seriously its proposed partnership with the National Science Foundation in carrying out its education programs at both the K-12 and higher education levels. In particular, the Committee recommends that the Department find a way to partner with the Foundation to co-fund excellent energy-related proposals submitted to the Foundation's Advanced Technological Education program rather than establishing a similar but separate 2-year college program within the Department. Finally, with respect to the \$55 million in new energy education funding proposed in the Department's FY 2011 budget request, the Committee recommends that the preponderance of funding under that proposal go toward the higher education activities described in this section.