



Summary of the Broadening Participation Working Group Report on the NSF Response to the CEOSE 2011-2012 Recommendation

The CEOSE Recommendation

The 2011-2012 CEOSE (Committee on Equal Opportunities in Science and Engineering) report requested that NSF launch a **bold new initiative** for broadening participation (BP) with the goal of eventually having the participation of scientists and engineers in Science, Technology, Engineering, and Math (STEM) fields mirror the population of the Nation. This initiative would recognize, adapt, and expand successful "best practices" in broadening participation and promote transformative research on the science of broadening participation; careful analysis and widespread dissemination of results would subsequently inform future research and investments to achieve the goals of diversity, inclusion, and parity.

This bold new initiative would have specific goals and components, including: **institutional and systemic change** to address recruitment, progression, and advancement in the federal and academic STEM workforce; focus on interventions that are **scalable** nation-wide; **integration** of current research results on BP and education into interventions, especially interventions aimed at training; use of **innovative, longitudinal analysis** to quantify the success of broadening participation efforts, including innovation in monitoring, assessment, and evaluation; **adoption of defined benchmarks** for all aspects of broadening participation (e.g., by disciplines, education levels, type of research, and type/phase of implementation activities, etc.); support for **translation, replication, and expansion of what works** to broaden participation, such that innovation and scaling are not competing activities for funding; **coordination of research centers and projects across levels of schooling**, from pre-K to 20+, and including formal and informal learning experiences and environments; provision of **direct financial support** to individuals (students, postdoctoral fellows, faculty, and practitioners) as investigators in broadening participation; promotion of **interagency and private sector partnerships** for shared vision, financial resources, implementation and dissemination; and, **long-term commitment** to impact STEM employment, education, and research.

Broadening Participation Working Group Recommendations

The NSF BP Working Group developed a matrix representing an array of options for NSF to augment its ongoing activities in broadening participation in STEM and respond to the 2011-2012 CEOSE recommendation. The matrix outlines a range of NSF activities beginning with the end of FY14 (i.e. August and September) through FY16. These ideas can also help inform NSF-wide activities envisioned for new BP efforts in FY2015 and beyond. These activities range from those very easy to implement quickly, such as an IdeaShare site to gather ideas on BP from NSF staff, to large-scale high investment activities such as Centers devoted to the science of broadening participation, or to broadening participation itself. Here we outline examples from three levels of activities that NSF could pursue:

New-term, low cost activities

IdeaShare activities: NSF employees, those serving NSF on Intergovernmental Personnel Act assignments (IPAs) and Visiting Scientists are an excellent resource of ideas about NSF priorities and mechanisms for broadening participation. We should tap into this wealth of experience and hold one or several IdeaShare activities designed to generate ideas about investments of varying size in the broadening participation initiative. IdeaShare challenges for broadening participation ideas could be undertaken during Fiscal Year (FY) 2015.

Use of community blogs: Blogs could serve as a reciprocal resource for NSF and the scientific communities. Blogs could generate conversations with scientists and/or educators about cutting-edge findings related to the science of broadening participation, and how to best implement and scale up these best practices. This would also be low

cost, but could have a high impact in terms of providing forums for dialogue and information-sharing between different stakeholders.

Supplemental funding: Supplemental funding is a major, low-risk mechanism by which NSF could augment its activities in broadening participation. Through Dear Colleagues Letters (DCLs) and other means, NSF programs and Divisions could notify the principal investigator (PI) community that increased emphasis on supplements will take place, and could outline a variety of supplement types that could be made. The particular demographic targets of supplements may vary by Directorate or Division, depending on the needs of the discipline. These could start as early as FY15.

Mid-scale activities

Community Design Projects: Community Design Projects are considered higher-risk and low to medium investment and would essentially include awards that address local or regional broadening participation efforts, including course and curriculum improvement, inclusion of culturally relevant pedagogies, faculty development, and institutional capacity building efforts. As a lower-risk strategy, replication of proven strategies that have been shown to enhance recruitment, retention, engagement, and persistence in STEM (e.g., bridge programs, cohort models, mentoring, and research experiences through internships and other mechanisms) should also be explored. Research has also highlighted the importance of addressing campus climate and culture as a contributor to successful broadening participation efforts. Examples of community design programs that can be translated into a broadening participation framework are the Partnership Undergraduate Life Science Education (PULSE) activities spearheaded by the Directorate of Biological Sciences (BIO) and the NSF-wide Increasing the Participation and Advancement of Women in Academic Science and Engineering Careers (ADVANCE) program. Additionally, scientific societies could play a major role in deploying best practices to the community and pursuing broadening participation.

Large-scale initiatives

Broadening Participation Institutes/Partnerships/Centers: High risk and medium to high investment options include Broadening Participation Centers that focus on the science and practice of broadening participation. While some of NSF's existing research centers may already include broadening participation as a goal, this and other new initiatives would call for new centers to be created with broadening participation as the central mission and the foundation for all other activities. These centers would focus on building the knowledge base for broadening participation, as well as on translating research to practice in scalable programs for widespread dissemination. The NSF Science of Learning Centers provide a good model and set of goals that might be used to inform these proposed centers which are intended to focus exclusively on broadening participation.

Large-scale national initiatives: The need for a robust STEM workforce has been reiterated in recent reports by the National Research Council (NRC), President's Council of Advisors on Science and Technology (PCAST) and the National Science Board (NSB). These reports offer extensive recommendations for strategies for addressing persistent disparities in racial, ethnic, and gender representation in STEM specifically by strengthening K-12 education, increasing student interest and motivation in STEM, and by increasing the number of underrepresented students successfully completing undergraduate STEM degree programs and who wish to pursue STEM careers. Large scale, national initiatives that address the full spectrum of the educational trajectory, from pre-kindergarten to graduate school and beyond are considered bold activities requiring large investment. Such initiatives might perform, collect, vet and disseminate research on best practices, provide a locus for the development of national communities of researchers and practitioners, and build public/private partnerships that can implement best practices at scale and create systemic changes. By taking a systems approach, NSF can help remove some of the barriers embedded in academic, social, and occupational systems that currently impede progress for underrepresented groups at all levels.

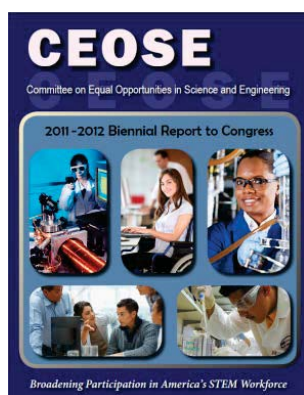
NSF Leadership in Broadening Participation Coordination and Communication

On the whole, NSF has a strong commitment to broadening participation activities. However, NSF's impact in broadening participation could be greater if we identify strategic goals for broadening participation that involve all Directorates, as well as increase the number of budgeted emphasis programs that directly target broadening participation. Additionally, effective communication throughout NSF is paramount. Although broadening participation must be an activity encompassing all of NSF and to which all NSF feels responsible, effective communication and coordination of activities could be enhanced via a NSF-wide committee responsible for the charge. Working with the Director, this committee would have representation from all NSF Directorates and could make clear the importance that the agency places on broadening the participation of underrepresented groups in science.

The Committee could help coordinate broadening participation activities across NSF by helping to share best practices throughout the Foundation and providing recommendations for diverse activities. These could include new funding activities, increasing the prominence of broadening participation language in the NSF merit criteria and in NSF solicitations, and enhancing the NSF broadening participation website, thereby providing a central clearinghouse for best practices at NSF and elsewhere. The website would also list NSF funding programs as well as demographic information by subfield and links to discipline-specific resources which provide guidance on ways to educate the scientific community, reviewers and panelists about the importance of broadening participation in NSF projects as well as best practices that make such efforts effective. These scientists and their communities could then be more effective ambassadors for NSF's broadening participation mission as a whole.

Concluding Thoughts

NSF must continue its leading role in broadening participation, which is a core value of the agency, a key component of broader impacts, and a recommendation advocated by NSF advisory committees to help address complex scientific and societal challenges. The NSF BP Working Group consensus is that NSF should develop a multidimensional strategy that is responsive to the 2011-2012 CEOSE recommendation:




"... NSF should implement a bold new initiative, focused on broadening participation of underrepresented groups in STEM that emphasizes institutional transformation and system change; collects and makes accessible longitudinal data; defines clear benchmarks for success; supports the translation, replication and expansion of successful broadening participation efforts; and provides significant financial support to individuals who represent the very broadened participation that we seek."

The NSF response to the call for a "bold new initiative" must be a focused effort resulting in new knowledge about participation in science and engineering, effective diversity practices for dissemination (including scaling up), and partnerships for greater inclusive investments in STEM. This will take a great investment in time and resources as well as tailored activities for the underrepresented groups because the challenges are not the same across STEM disciplines or across and within the groups: women, underrepresented minorities, and persons with disabilities. The specific needs of the groups must be met while understanding that systemic approaches for diversity must occur at all levels to ensure significant gains in representation and advancement of all groups in STEM disciplines and careers. Thus, the call to action is a catalytic moment for NSF to enable its research communities to help accomplish both, CEOSE's 2011-2012 recommendation and NSF's FY 2014-2018 strategic goals for diversity.

NSF BROADENING PARTICIPATION OPTIONS

Level of Investment by Level of Boldness (Size and Novelty of Effort) versus Potential Impact

 BOLDNESS		POTENTIAL IMPACT		
		LOW	MEDIUM	HIGH
FY16	High	<ul style="list-style-type: none"> Call for Community Design Projects in response to the 2011-2012 CEOSE recommendation Provide funding for BP infrastructure that PIs could “plug in” to for meaningful BP Broader Impacts 	<ul style="list-style-type: none"> Call for BP Institutes/Centers conducting BP research and increasing the number of UR scientists and engineers Call for Partnerships/Centers that can translate BP research into scalable programs for widespread dissemination¹ 	<ul style="list-style-type: none"> Call for large-scale BP partnerships that cover research, implementation and scaling across preK-20+, focusing on institutional and systemic outcomes²
FY15	Medium	<ul style="list-style-type: none"> Increase the availability of BP Supplements via DCLs from directorates Make available BP data by subfields Encourage PIs/faculty to participate in diversity meetings Form a Rotator Corps for BP Expand Science: Becoming the Messenger Workshop to have a BP focus 	<ul style="list-style-type: none"> Support additional replication of successful implementations³ or additional partnering with model BP programs⁴ Leverage efforts like REU, I-Cubed (I³), PULSE, etc. Make supplemental funding available to <u>all</u> NSF research centers for BP goals (contingent on strong existing efforts) Engage STEM Diversity Organizations and have an NSF BP presence at their national meetings 	<ul style="list-style-type: none"> Increase in number of Emphasis and other programs reaching the 50% threshold⁵ Offer support for mid- and large-scale BP theoretical studies with potential for large scale implementation Identify strategic goals for BP for NSF that address all directorates. Increase the prominence of BP language in the merit review criteria and in Annual and Final reporting
	Immediate Implementation	<ul style="list-style-type: none"> Provide BP Memo to NSF Staff from the Director Enhance BP website with best/promising practices More systematically inform NSF staff about best practices in BP Form an agency-wide BP advocacy group to increase communication and identify cross-agency BP goals 	<ul style="list-style-type: none"> Provide Important Notice to Community about BP Establish BP Policies for Workshops Agency-wide (see BIO) More systematically inform panelists and reviewers about best practices in BP Support NSF-wide workshops on BP from experts in the BP field 	<ul style="list-style-type: none"> Increase the prominence of BP language in solicitations, on NSF website and via social media used by OLPA Use community blogs to promote BP discussions Create BP IdeaShare for gathering ideas/input, etc.

1. See perts.net and [NCWIT](http://NCWIT.org).

2. See the [BPC Alliance Program](#) in aggregate and former Systemic Initiatives, such as USP and RSI.

3. See Page 12, Institutional Commitment to Leadership at Colleges and Universities to increase Diversity in Engineering and Science (IDES), a version of ADVANCE.

4. See [GEO LSAMP](#), and [MPS AGEP](#).

5. See [Budget Table for Programs to Broaden Participation](#) for FY2015.

