

CHARGE

COMMITTEE ON EDUCATION AND HUMAN RESOURCES EXPERT PANEL DISCUSSION ON PREPARING THE NEXT GENERATION OF STEM INNOVATORS¹

Purpose

The National Science Board (Board) Committee on Education and Human Resources (CEH) is charged to undertake a study to fulfill the goal articulated in the Board's *National Science Board National Action Plan for Addressing the Critical Needs of the U.S. Science, Technology, Engineering and Mathematics (STEM) Education System* (NSB 07-114) to enhance "the Nation's ability to produce a numerate and scientifically and technologically literate society and to increase and improve the STEM education workforce." In approving its STEM Action Plan, the Board recognized that "Strategies for producing the next generation of innovators are not explicitly addressed in this action plan and will require subsequent study."

An *ad hoc* Task Group of CEH will lead the study whose purpose will be to identify strategies for increasing the number of STEM innovators in the next generation, and to develop recommendations for how the National Science Foundation, and possibly other Federal entities, might engage in fostering the development of the next generation of STEM innovators and in conducting rigorous research to better understand this process. As part of its effort, the Board will sponsor a two-day expert panel discussion on this topic and produce a white paper from this expert group with recommendations for consideration by the Board.

Statutory Basis

NATIONAL SCIENCE BOARD (42 U.S.C Section 1863) SEC. 4(j) (2) The Board shall render to the President and to the Congress reports on specific, individual policy matters related to science and engineering and education in science and engineering, as the Board, the President, or the Congress determines the need for such reports.

Link to National or NSF Policy Objective

The Nation needs both financial resources and STEM talent to drive our highly technological and knowledge-based economy. The Board has argued in a number of its recent policy reports that the U.S. is too dependent on importing STEM talent from other countries, rather than nurturing a

¹ "Innovators" are being defined here as those individuals who have developed the expertise to become leading STEM professionals, and might even have become the creators of significant breakthroughs or advances in scientific and technological understanding -- some of which may have completely changed research fields and/or might be patentable, for example.

sufficient pool of this talent through our own educational system.² Other organizations and entities have also addressed issues related to STEM innovators, including the recent report of the National Mathematics Advisory Panel³. The President's American Competitiveness Initiative, the America COMPETES Act legislation, and the National Academies report, *Rising Above the Gathering Storm*, all recognize the importance of STEM talent to our economy. It would be appropriate for NSF, with a mission that encompasses both the development of STEM excellence (e.g., the NSF Graduate Fellowships) and equity (e.g., the Math and Science Partnerships program) to take a lead toward enabling our Nation to make headway on the dual objectives of global economic competitiveness and educational equity in STEM and to develop a road map for how schools, organizations outside of schools, and universities can challenge talented students during their scientifically formative years—adolescence and early adulthood—and recommend a research program to rigorously study their effectiveness.

Topics for Study

An expert panel discussion would involve a range of goals, such as:

- Identifying strategies for nurturing the talents of those individuals in adolescence and early adulthood who are likely to become the next generation of high level STEM professionals and innovators.
- Exploring the possible existence of pools of potential talent in our society that currently are overlooked, under-developed, and under-utilized, but who could become a source of adults productive in STEM and who could fuel innovation in this country.
- Creating a research agenda on effective means for nurturing and developing the STEM talent in youth and early adulthood in order to accelerate the STEM productivity and creativity of such individuals over their careers.
- Suggesting and encouraging development of policies that could help ensure a strong pipeline of STEM talent and nurture innovation in the STEM workforce.

Logistics

The National Science Board Office will be the focal point for providing all aspects of Board support for this Board activity; coordinating NSF, the involvement of other agencies and institutions; and utilizing contractual or NSB Office staff resources to support events in connection with this Board-sponsored activity.

An agenda and a comprehensive list of potential participants for the two-day expert panel discussion will be developed with input from Board Members, NSF management, and other knowledgeable sources in the broader STEM research and education community.

² Recent Board policy reports addressing this subject include the Companion Piece to Science and Engineering Indicators 2008, *Research and Development: Essential Foundation for U.S. Competitiveness in a Global Economy* (NSB-08-3), the Companion Piece to *Science and Engineering Indicators 2006, America's Pressing Challenge—Building a Stronger Foundation*; the Companion Piece to the 2004 Indicators, *An Emerging and Critical of the Science and Engineering Labor Force* (NSB 04-7), *Moving Forward to Improve Engineering Education* (NSB 07-122) and *The Science and Engineering Workforce—Realizing America's Potential* (NSB 03-69).

³ *Final Report of the National Mathematics Advisory Panel*, March 2008, Department of Education.

CEH leadership

NSB/CEH will recommend full Board approval of the appointment of an *ad hoc* Task Group of CEH to provide oversight for, and actively engage in, this activity, on behalf of the CEH Committee with membership including: Drs. Camilla Benbow, John Bruer, José Marie Griffiths, Louis Lanzerotti, and Diane Souvaine.

Product

The final output from this activity will be a concise set of Board-approved recommendations to NSF (and perhaps to other Federal entities), informed by a white paper capturing the results of the expert panel discussion and reflecting input from NSF and other agency expert staff, written background materials addressing these issues, and comments from interested communities on initial, Board-approved draft recommendations.

Schedule

A final, concise report will be submitted to the Board for approval and publication by spring 2010.

Audience:

In addition to the President, Congress, and NSF:

- Federal agencies involved in STEM education
- State and local organizations and individuals involved or interested in STEM education
- Educational and professional organizations with interests in STEM education
- Employers of STEM-educated workers