National Science Board

NSB-05-43
April 1, 2005

MEMORANDUM TO MEMBERS OF THE NATIONAL SCIENCE BOARD

SUBJECT: Major Actions and Approvals at the March 30, 2005 Meeting

This memorandum will be publicly available for any interested parties to review. A more detailed summary of the meeting will be posted on the National Science Board (NSB, the Board) public Web site within 10 business days. A comprehensive set of NSB-approved Open Session meeting minutes will be posted on the Board's public Web site following the May 2005 meeting.

Major actions and approvals at the 385th meeting of the Board included the following (not in priority order):

1. The Board approved the minutes of the Plenary Open Session (NSB-05-17) for the February 2005 meeting of the NSB (http://www.nsf.gov/nsb/meetings/2005/0205/open_min_feb05.pdf). Minutes for the Plenary Executive Closed and Closed Sessions for the February 2005 meeting of the NSB were also approved.

2. The Board approved a resolution to close portions of the upcoming May 25-26, 2005 NSB meeting on staff appointments, future budgets, pending proposals/awards for specific grants, contracts, or other arrangements, and those portions dealing with specific Office of the Inspector General investigations and enforcement actions, or agency audit guidelines (NSB-05-21) (Attachment 1).

3. The Board approved recipients for the 2005 Alan T. Waterman Award, Vannevar Bush Award, and the NSB Public Service Awards. Awardees will be announced after the NSF Director and NSB Chairman have notified the awardees of their selection.

4. The Board approved a resolution that authorized the Director, at his discretion, to renew the cooperative agreement with Cornell University to manage and operate the National Astronomy and Ionosphere Center (NAIC) from April 1, 2005 to March 31, 2010. Funding beyond the first 18 months will be determined at a later date and submitted for Board approval.

5. The Board approved a resolution that authorized the Deputy Director, at his discretion, to make an award to the University of Chicago for the project *ETF Grid Infrastructure Group: Providing System Management and Integration for the TeraGrid* for 60 months. Funding beyond year two is contingent on a Board-approved NSF strategy for high performance computing that describes how NSF centers will cooperate, and how each will inter-operate and relate to the existing and emerging NSF and national investments in cyberinfrastructure.

6. The Board approved a resolution that authorized the Deputy Director, at his discretion, to make an award to Carnegie Mellon University and the University of Pittsburgh through MPC Corporation for Pittsburgh Supercomputing Center for *TeraGrid Resource Partners* for 60 months. Funding beyond year two is contingent on a Board-approved NSF strategy for high performance computing that describes how NSF centers will cooperate, and how each will inter-operate and relate to the existing and emerging NSF and national investments in cyberinfrastructure.

7. The Board approved the release for public comment of the draft report of the National Science Board, *Long-Lived Digital Data Collections: Enabling Research and Education in the 21st Century* (NSB-05-40). (http://www.nsf.gov/nsb/meetings/2005/LLDDC_Comments.pdf).

8. The Board approved a charge to the Committee on Education and Human Resources for a "Workshop on Engineering Workforce Issues and Engineering Education: What are the Linkages?" (NSB-05-41) (Attachment 2).

9. The Board approved the establishment of an *ad hoc* Task Group on "Vision for NSF Science and Engineering Research and Education" (NSB-05-42) (Attachment 3). The Task Group will be chaired by Dr. Delores Etter, with members Drs. Barry Barish, Douglas Randall, and Kathryn Sullivan. The task group will report directly to the full Board and will consult closely with the four standing committees. The NSB Chair, NSB Vice-Chair, NSB Committee on Strategy and Budget Chair, and NSB Executive Committee Chair will serve as *ex officio* members of the *ad hoc* Task Group.

Michael P. Crosby
Executive Officer

Attachment 1: (NSB-05-21)
Attachment 2: (NSB-05-41)
Attachment 3: (NSB-05-42)

National Science Board

NSB-05-21
February 28, 2005

MEMORANDUM TO MEMBERS OF THE NATIONAL SCIENCE BOARD

SUBJECT: Closed Session Agenda Items for May 25-26, 2005 Meeting

The Government in the Sunshine Act requires formal action on closing portions of each Board meeting. The following are the closed session agenda items anticipated for the May 25-26, 2005 meeting.

1. Staff appointments

2. Future budgets

3. Grants and contracts

4. Specific Office of Inspector General investigations and enforcement actions

A proposed resolution and the General Counsel's certification for closing these portions of the meetings are attached for your consideration.

Michael P. Crosby
Executive Officer

Attachments

PROPOSED
RESOLUTION
TO CLOSE PORTIONS OF
386th MEETING
NATIONAL SCIENCE BOARD

RESOLVED: That the following portions of the meeting of the National Science Board (NSB) scheduled for May 25-26, 2005 shall be closed to the public.

1. Those portions having to do with discussions regarding nominees for appointments as National Science Board members and National Science Foundation (NSF) staff appointments, or with specific staffing or personnel issues involving identifiable individuals. An open meeting on these subjects would be likely to constitute a clearly unwarranted invasion of personal privacy.

2. Those portions having to do with future budgets not yet submitted by the President to the Congress.

3. Those portions having to do with proposals and awards for specific grants, contracts, or other arrangements. An open meeting on those portions would be likely to disclose personal information and constitute a clearly unwarranted invasion of privacy. It would also be likely to disclose research plans and other related information that are trade secrets, and commercial or financial information obtained from a person that are privileged or confidential. An open meeting would also prematurely disclose the position of the NSF on the proposals in question before final negotiations and any determination by the Director to make the awards and so would be likely to frustrate significantly the implementation of the proposed Foundation action.

4. Those portions having to do with specific Office of the Inspector General investigations and enforcement actions, or agency audit guidelines.

The Board finds that any public interest in an open discussion of these items is outweighed by protection of the interests asserted for closing the items.

CERTIFICATE

It is my opinion that portions of the meeting of the National Science Board (NSB) or its subdivisions scheduled for May 25-26, 2005 having to do with nominees for appointments as NSB members and National Science Foundation (NSF) staff, or with specific staffing or personnel issues or actions, may properly be closed to the public under 5 U.S.C. § 552b(c) (2) and (6); those portions having to do with future budgets may properly be closed to the public under 5 U.S.C. § 552b(c) (3) and 42 U.S.C. 1863(k); those portions having to do with proposals and awards for specific grants, contracts, or other arrangements may properly be closed to the public under 5 U.S.C. § 552b(c) (4), (6), and (9) (B); those portions disclosure of which would risk the circumvention of a statute or agency regulation under 5 U.S.C. § 552b(c) (2); and those portions having to do with specific Office of the Inspector General investigations and enforcement actions may properly be closed to the public under 5 U.S.C. § 552b(c) (5), (7) and (10).

/Signed/
Lawrence Rudolph
General Counsel
National Science Foundation

NSB-05-41
Approved March 30, 2005

Committee on Education and Human Resources
Workshop on Engineering Workforce Issues and Engineering Education:
What are the Linkages?

Purpose
An initial, single day NSB-sponsored workshop is proposed to focus on recent recommendations for changes in engineering education and implications for the engineering workforce. A foundation for workshop discussions will include the cross cutting issues in the recent National Academy of Engineering report, *The Engineer of 2020: Visions of Engineering in the New Century,* as well as the NSB reports that identified troublesome trends in the number of domestic engineering students, with potential impacts to U.S. preeminence in S&E based innovation and discovery. The major workshop objective is to move the national conversation on these issues forward in a productive way by calling attention to how engineering education must change in light of the changing workforce demographics and needs. The National Academy of Engineering (NAE), which sponsored the Engineer of 2020 study, has undertaken a Phase II study. The proposed NSB workshop would be in parallel to these NAE efforts. The NSB workshop would focus more substantially on the issues of the current and desired future engineering workforce in light of the Engineer of 2020 report.

Statutory basis
NATIONAL SCIENCE BOARD (42 U.S.C. Section 1863) SEC. 4 (j) (2) The Board shall render to the President for submission 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
It is widely recognized that our economy, national security, and indeed our everyday lives are increasingly dependent on scientific and technical innovation. Changes on a global scale are rapidly occurring for engineering, and Federal leadership is needed to respond quickly and informatively. The Board has issued several reports expressing concern about long-term trends that affect the U.S. workforce capabilities in engineering, including the dependence on international students and workers; the declining interest on the part of U.S. citizens in engineering studies and careers; weakness in the K-12 science, technology, engineering, and mathematics education system; and demographic trends that are unfavorable to increasing citizen participation rates in these fields. Engineers are the largest component of workers with college degrees in S&E occupations, with 39 percent of all S&E occupations in 1999. Almost half of S&Es in the labor force with bachelors' degrees as their highest-level degree are engineers. This field therefore has a huge impact on our national capabilities for S&T and deserves special attention.

There is a current high level of attention to engineering education from a variety of sources that converge to make engineering education an especially timely topic for the Board to address. These include the recent release of the National Academy of Engineering report, *The Engineer of 2020: Visions of Engineering in the New Century*, which calls for reform in engineering education; the National Science Board reports on unfavorable trends affecting long-term U.S. workforce capabilities in science and engineering and the need to address these trends along all points of the education pipeline; the concern of U.S. industry and the public sector in engineering capabilities in the workforce; and the poor progress in broadening participation in engineering.

Logistics
The NSB Office will be the focal point for providing all aspects of Board support in this NSB activity; coordinating NSF, other agencies and institutions involvement; and utilization of one or more NSB Office

contractual agreement(s) to assist with meeting logistics. NSB/EHR will recommend full Board approval of the appointment of an *ad hoc* Task Group of EHR to provide oversight for, and actively engage in, this activity.

An agenda and a comprehensive list of potential participants in the event will be developed with input from Board Members, NSF management, contacts in other agencies, and the broader S&T research and industry community. Invitees would include young recently graduated engineers, more experienced engineers, a range of employers (spanning the range of engineering disciplines), university thought leaders on engineering, and experts on engineering demographics.

Timing: Fall/Winter 2005

Workshop Topics: A workshop on the linkages between workforce issues and engineering education would involve a large range of topics, such as:

1) What are different scenarios for engineering workforce development in the U.S.? What are the differences among engineering fields?
2) How successful have we been in predicting the engineering workforce needs in the past and what has happened to the engineers when we got it wrong?
3) What are the implications of the different scenarios for engineering education?
4) What are the roles of the different stakeholders in the development of the engineering workforce, particularly the professional societies, universities, working engineers (of differing ages) and employers?
5) What is a typical demographic for an engineer today, and what will it become? How do we broaden participation?
6) The past and future role of international students and engineers in the U.S. engineering workforce.
7) The changing role of engineering education in preparing for engineering workforce needs for the future, including graduate education and lifelong learning as career shifts occur, and the idea that engineering education might be to prepare students more broadly for employment in the public, nonprofit, academic, and industry sectors.
8) How do we ensure that the best and the brightest students pursue engineering studies and careers, and that their education quality, content, and teaching are of the highest caliber?

Workshop Product: The final output from the meeting will be a concise set of Board approved recommendations that tie back to what universities (with employers) and NSF can affect, published in paper and electronic formats.

Audiences: In addition to the President, Congress, and NSF:

- Engineering deans/departments/schools
- ABET
- Engineering thought leaders
- Leaders in technical industry and the public sector that employ engineers.

Attachment 3 to NSB-05-43

NSB-05-42
March 30, 2005

National Science Board
"Vision for NSF Science and Engineering Research and Education"

Statutory Basis
"...the Board shall establish the policies of the Foundation, within the framework of applicable national policies as set forth by the President and the Congress." [SEC. 4. (a)]

Action Requested by Congress
The Senate has requested the National Science Board to exercise their legislated authority and responsibility by developing and establishing a new vision for the National Science Foundation for the 21st Century. A succinct (12-15 pages) visionary document is requested to be finalized by the end of 2005 and include overarching goals with both long- and short-term priorities that take into account federal fiscal realities. This Senate request is complementary to Board discussion at the February 2005 Retreat.

Senator Bond, Appropriations Subcommittee, February 17, 2005
"Given the constrained funding environment, it is even more critical that the National Science Board develop a long-term vision for NSF…. This means articulating a vision for the future of science and technology, including the next bold cutting-edge areas of research…. The Board is ideally suited for this responsibility and I believe strongly that it is a core activity of the Board's mission."

Approach and Logistics
- NSB Chair will appoint an NSB *ad hoc* task group of three or four dedicated Board Members to focus on conceptualizing and drafting an initial document.
- NSB Chair, NSB Vice-Chair, NSB CSB chair and NSB Executive Committee chair all serve in an *ex officio* capacity on this *ad hoc* task group, participating and providing comments to the degree that they are able. Through the Executive Committee chair, NSF management will have continuous ability to provide comment as the vision document is developed.
- The task group will consult primarily with CSB as it develops a draft document for full Board discussion and approval. However, this activity will be considered an activity of the full Board.
- Starting point will be the 1998 *NSB Strategic Plan* and the 2003 *NSF Strategic Plan*. However, a new vision for the future of science and technology should be established as a bold statement on the cutting edges of research. Need to also articulate priorities and challenges, and how NSF will lead in meeting these challenges.
- A&O Committee will develop and provide *ad hoc* task group with a refined statement on the role and responsibility of the Board, building on the 1998 NSB Strategic Plan statement and follow-up from February 2005 NSB Retreat. CPP and EHR will provide input to the task group regarding long- and near-term NSF program priorities.

- Board Office staff will directly support the *ad hoc* task group effort, augmented by any of their contractor support that is needed.

Final document will contain –

- Long-term vision and goals for the 21st Century
- Clear statement of NSB role and responsibilities
- Characterization of the near-term federal budget environment and related constraints on federal investment in S&E research and education.
- 3, 5, and 10 year priorities, with 3 and 5 year priorities based on current budget realities
- 3, 5 and 10 year "workplan" for the NSB

Example of a Near-Term Action for the Board

"Working with the NSF Director, oversee a comprehensive re-examination of all NSF R&RA and EHR programs in terms of how they meet both the long and short term priorities, overall goals and vision set forth in the NSB "Vision for NSF Science and Engineering Research and Education."

Milestones

- March 2005 – NSB Chair appoints *ad hoc* Task Group on Vision (Vision TG) and provides it with a general charge that full Board will discuss and refine.
- April 2005 – (half day meeting) Vision TG refines its general charge into a draft outline of the vision document with specific tasks assigned to Vision TG members and NSB Office staff.
- May 2005 – First rough draft of vision document woven together by NSB Office using Vision TG member input; sent to Vision TG and *ex officio's* for comment.
- May 2005 – (half day meeting) Vision TG refines rough draft based on comments; send to CSB for review and comment at upcoming May 2005 meeting.
- May 2005 – (NSB meeting) CSB discusses rough draft.
- June 2005 – Rough draft revised with initial formatting similar to existing 1998 NSB Strategic Plan; NSB Office contractor who is expert on preparing vision documents is consulted.
- July 2005 – Clean draft document sent to Vision TG and *ex officio's* for comment.
- July 2005 – (half day meeting) Vision TG refines draft based on comments.
- August 2005 – (NSB meeting) CSB discusses clean draft vision document.
- September 2005 –(half day meeting) Vision TG makes final revisions to draft and document if put into final format.
- September 2005 – (NSB meeting) CSB discusses and make recommendation to full Board that draft vision document be released for public comment.
- November 2005 – (half day meeting) Vision TG makes final revisions based on public comment.
- December 2005 – (NSB meeting) Vision TG presents final document to CSB and the Board for final approval.