

MEMORANDUM TO MEMBERS AND CONSULTANTS OF THE NATIONAL SCIENCE BOARD

SUBJECT: Summary Report of the December 1-2, 2010 Meeting

The major actions and approvals of the National Science Board (Board, NSB) and a preliminary summary of the proceedings at the Board's December 2010 meeting are provided. This memorandum is also made available for public review. The minutes of the Plenary Open Session for the December 2010 meeting will be posted on the Board's public Web site (<http://www.nsf.gov/nsb/>) following Board approval.

1. Major Actions and Approvals at the 417th NSB Meeting (not in priority order):

- a. The Board authorized the NSF Director, at his discretion, to extend funding for the Science of Learning Center (SLC): Learning in Informal and Formal Environments (LIFE) Center to the University of Washington.
- b. The Board authorized the Acting Deputy Director, at her discretion, to extend funding for the SLC: Center of Excellence for Learning in Education, Science, and Technology (CELEST) to Boston University.
- c. The Board authorized the NSF Director, at his discretion, to issue a Request for Proposal for Arctic Research Support and Logistic Services.
- d. The Board approved the recipients for the 2011 Vannevar Bush Award and the 2011 NSB Public Service Awards. The names of the awardees will be revealed in a public announcement this spring.
- e. The Board agreed on the site of the next annual Board retreat and off-site visit to be held on September 13-14, 2011.
- f. The Board Chairman discharged the Task Force on the NSB 60th Anniversary, with thanks to Dr. Patricia Galloway, chairman, and Drs. Camilla Benbow, John Bruer, José-Marie Griffiths, Douglas Randall, Kathryn Sullivan, and Thomas Taylor, members.
- g. The Board approved the minutes of the Plenary Open Session (NSB-10-58) for the August 2010 meeting (<http://www.nsf.gov/nsb/meetings/2010/0825/minutes.pdf>) and the minutes of the Plenary Open Session (NSB-10-73) for the September 2010 meeting (<http://www.nsf.gov/nsb/meetings/2010/0924/minutes.pdf>). Minutes for the Plenary Executive Closed Session (NSB-10-72) for September 2010 and the Plenary Closed Session (NSB-10-57) for the August 2010 meeting of the Board were also approved.

2. Board Chairman's Report

Dr. Ray Bowen, NSB Chairman, reported on the Board's recent outreach. On October 6, 2010, he participated in a day-long symposium in Japan in honor of the 50th Anniversary of NSF's Tokyo Regional Office. The U.S.-Japanese cooperation is a significant result of the efforts of that office. He gave a presentation on the impact of 50 years of U.S.-Japan science and technology cooperation on advances in science and engineering research and education through a U.S. perspective. Also, on October 10, 2010, Dr. Bowen was the keynote speaker at the Richard E. Smalley Institute for Nanoscale Science and Technology at Rice University, which was in honor of the discovery of buckyballs some 25 years ago and the subsequent rise of the nanotechnology industry. Additionally, Dr. Bowen worked with Board Members to prepare a response to a study that focused on the health and competitiveness of our Nation's research universities, which was submitted to the Committee on Research Universities of the National Research Council.

The Chairman recognized Dr. Elizabeth Hoffman who was recently named the recipient of the 2010 Carolyn Shaw Bell Award. This award by the American Economic Association (AEA) recognizes her achievements which, by example, have furthered the status of women in the economics profession. The award will be presented at the annual meeting of the AEA in Denver, Colorado, in January 2011.

Dr. Bowen discharged the Task Force on the NSB 60th Anniversary. (See 1.f.)

Finally, on behalf of the entire Board, Dr. Bowen welcomed Dr. Subra Suresh, the 13th NSF Director. Dr. Suresh comes to NSF from the Massachusetts Institute of Technology (MIT) where he most recently served as the Dean of the Engineering School and the Vannevar Bush Professor of Engineering. The U.S. Senate confirmed Dr. Suresh for the 6-year term on September 29, 2010, and he was sworn-in on October 18, 2010. Dr. Suresh succeeded Dr. Arden Bement, who led the agency from 2004 until May 2010.

3. NSF Director's Report

Dr. Suresh, NSF Director, introduced the following new NSF staff:

- Dr. Rachel Croson, Division Director, Division of Social and Economic Sciences (SES), Directorate for Social, Behavioral, and Economic Sciences (SBE) (as of September 7, 2010).
- Dr. Keith Marzullo, Division Director, Division of Computer and Network Systems (CNS), Directorate for Computer and Information Science and Engineering (CISE) (as of September 20, 2010).
- Dr. Matthew Platz, Division Director, Division of Chemistry (CHE), Directorate for Mathematical and Physical Sciences (MPS) (as of September 27, 2010).
- Dr. John C. Wingfield, Division Director, Division of Integrative Organismal Systems (IOS), Directorate for Biological Sciences (BIO) (as of September 29, 2010).

Additionally, Dr. Suresh announced the following:

- Dr. Farnam Jahanian will join NSF in February 2011 to head CISE.
- Dr. Lance Haworth, Director, Office of Integrative Activities (OIA), will retire on December 31, 2010.

For the congressional update, Dr. Suresh reported that since the September NSB meeting, the Senate confirmed his nomination to be NSF Director. On September 30, 2010, the President signed into law a continuing resolution to keep the Federal Government operating at FY 2010 levels through December 3. On December 1, 2010, the House of Representatives passed another continuing resolution through December 18, 2010, and the Senate was expected to pass it on December 2 or 3.

Dr. Suresh reported that the National Medal of Science and the National Medal of Technology and Innovation were presented by President Obama on November 17, 2010 at the White House. There were 10 National Medal of Science awardees and 6 National Medal of Technology and Innovation awardees; 3 of the latter received a team award. Of the 10 Medal of Science laureates, 9 had ties to the National Science Foundation and the National Science Board, which included Dr. Warren Washington, who served on the Board from 1994 to 2006 and was NSB Chairman from 2002 to 2006; and Dr. Marye Anne Fox, who served on the Board from 1990 to 1996, and was NSB Vice Chairman from 1994 to 1996.

4. Board Committee Reports

[Note: The Executive Committee and the Task Force on the NSB 60th Anniversary did not meet in December 2010.]

a. Committee on Audit and Oversight (A&O)

In A&O Open Session, the committee heard a number of presentations. Dr. Cora Marrett, Acting NSF Deputy Director, and Dr. Judith Sunley, newly-appointed Interim Chief Human Capital Officer, discussed NSF's efforts to enhance Human Resource Management. Ms. Allison Lerner, Inspector General, announced recent indictments resulting from Office of Inspector General (OIG) staff efforts. Mr. Sal Ercolano of Clifton Gunderson LLP and Partner-in-Charge of the NSF financial statement audit, presented the audit results, NSF's 13th consecutive "clean" audit opinion. Both he and Ms. Andrea Norris, Chief Information Officer (CIO), discussed the FISMA (Federal Information Security Management Act) report on NSF's IT security program, in which no significant deficiencies were found. Dr. Brett Baker, Assistant Inspector General for Audit, presented the OIG FY 2011 Audit Plan. Ms. Martha Rubenstein, Chief Financial Officer (CFO), gave an update on a variety of matters including the FY 2010 financial statement audit, progress made on addressing the Significant Deficiency in Contract Monitoring of Cost Reimbursable Contracts, and progress on the development of a new agency financial systems (iTRAK). Dr. Kelvin Droegemeier gave an update on the Committee on Programs and Plans (CPP) discussion on November 30, 2010 about rethinking the NSB delegation methodology and overall programmatic oversight approaches.

In A&O Closed Session, the committee discussed a pending procurement matter.

b. Committee on Education and Human Resources (CEH)

The committee discussed the recently released PCAST (President's Council of Advisors for Science and Technology) report, *Prepare and Inspire: K-12 Education in Science, Technology, Engineering, and Math (STEM) for America's Future*. Dr. S. James Gates, Jr., a PCAST member and co-chairman of the PCAST K-12 STEM Education Working Group, gave a presentation that highlighted the key concerns and main recommendations of the report. Dr. Joan Ferrini-Mundy, Acting Assistant Director, Directorate for Education and Human Resources (EHR), provided brief comments regarding EHR's near-term responses to the PCAST recommendations.

The committee then discussed steps being taken by NSF in response to the recommendations made in several recent STEM education policy reports, including the Board's report, *Preparing the Next Generation of STEM Innovators: Identifying and Developing Our Nation's Human Capital (NSB-10-33)*. Dr. Ferrini-Mundy provided a brief summary of NSF's response thus far. Dr. Peter Arzberger, Acting CISE Assistant Director, contributed to this discussion. Dr. Ferrini-Mundy invited the committee's input on how to engage both the STEM and STEM education research communities in achieving the goals of the STEM Innovators report and identifying opportunities for strategic leveraging that could increase the impact of NSF's investments in addressing the goals of these collective reports.

c. Committee on Science and Engineering Indicators (SEI)

The committee designated lead reviewers for all SEI chapters, except Chapter 4. It agreed that draft chapters should be distributed for review electronically, with paper copies sent to Board Members only when they request them. The committee heard interim updates on efforts to enlist expert advice on how to improve the graphics and Web functionality of the State Indicators chapter and on SBE's review of the Board's science knowledge indicators.

Dr. Lynda Carlson, Director, Division of Science Resources Statistics (SRS), briefed the committee on various data development activities in which SRS has been engaged, many of which respond to issues where Board Members expressed interest. In the short run, the committee expects new data on business research and development (R&D) and innovation, green energy patents, immigrant scientists, and recession-related changes in R&D and the science and engineering (S&E) workforce. For the longer run, development efforts promise better data on R&D-related costs at universities, early career scientists, and microbusinesses and the entrepreneurs who start them.

d. Committee on Programs and Plans (CPP)

In CPP Open Session, the committee continued the discussion of the NSB threshold policy for awards requiring NSB review, led by former CPP chairman, Dr. Droegemeier. Dr. Droegemeier, with the assistance of the Board Office and NSF staff, put together a detailed analysis of specific policy options and discussion points. To provide some NSF context, Dr. Marrett introduced three members of NSF's senior management team: Ms. Martha Rubenstein, CFO; Dr. Timothy Killeen, Assistant Director, Directorate for Geosciences (GEO); and Dr. Myron Gutmann, SBE Assistant Director. The committee will work with Board Office and NSF staff to make revisions, and will present a new draft for review at a January 2011 teleconference meeting.

Dr. Marrett continued the discussion on NSF implementation of the Board's recompetition policy. NSF presented a draft document in response to the committee's request for an implementation plan and list of impacted facilities. Dr. Mark Coles, Deputy Director for Large Facilities Projects; Dr. Joann Roskoski, Acting BIO Assistant Director, and Dr. Killeen offered some NSF viewpoints on issues related to implementation of the recompetition policy. Committee members were asked to send written comments on the draft to the committee executive secretary to be forwarded to NSF for further revision. The next draft will be discussed at the February 2011 meeting.

Dr. Edward Seidel, MPS Assistant Director, and Dr. James Ulvestad, Division Director, Division of Astronomical Sciences (AST), gave an update on the status of the recently released Astronomy and Astrophysics Decadal Survey (Astro2010) and the Large Synoptic Survey Telescope (LSST).

Dr. Phil Puxley, MPS Program Officer, presented an information item on the operation of the Atacama Large Millimeter/submillimeter Array (ALMA), and notified the committee of an upcoming action item. The current award to Associated Universities, Inc. (AUI) expires in 2011. NSF intends to bring an action item to the Board at the February 2011 meeting.

Dr. Alan Blatecky, Acting Director, Office of Cyberinfrastructure (OCI), provided an update on DataNet. A revised vision for DataNet is being incorporated into program plans building on the first two awards made in November 2008. NSF-wide and Directorate working groups have been established to develop plans for DataNet in 2012. A new DataNet solicitation will be issued.

In CPP Closed Session, the committee heard one information item on a status update on a High Performance Computing Award. The committee also considered an action item on the Deep Underground Science and Engineering Laboratory (DUSEL), and voted not to forward it to the full Board for approval.

Additionally, the committee considered three action items in Closed Session that it forwarded to the full Board for approval:

- Learning in Informal and Formal Environments (LIFE) Center at the University of Washington
- Center of Excellence for Learning in Education, Science and Technology (CELEST) at Boston University
- Request for Proposal and Award of a Contract for Arctic Research Support and Logistics Services

[The full Board subsequently approved the three award resolutions.] (See 1.a. – 1.c.)

CPP Subcommittee on Polar Issues (SOPI)

Dr. Karl Erb, Director, Office of Polar Programs (OPP), gave an update on the procurement activity for both the Antarctic and Arctic contracts. The Antarctic contract award target date is September 2011, and this issue was further discussed at the A&O meeting. Dr. Erb also gave a report on the status of icebreakers used by NSF. The two U.S. Coast Guard ships that would be used on standby to provide backup for the Swedish icebreaker *Oden* are both in dry dock this year. However, Dr. Erb noted that the *Oden* is a capable ship and that ice conditions appear to be mild, so no problems are anticipated. He also noted that as of December 1, the IceCube project

has entered its final year of drilling, and commended the University of Wisconsin-lead group on a job well done. Lastly, Dr. Erb reminded the committee of the two-phase study of the U.S. Antarctic Program that will take place over the next year. This two-phase study consists of a review by the National Research Council to identify future drivers of Antarctic science and a Blue Ribbon Panel to determine options for meeting the required logistics and infrastructure.

Dr. Martin Jeffries, former OPP Program Director, gave an update on the Arctic ice cover, noting that the ice has been decreasing in both coverage and thickness, resulting in a dramatic change in ice volume since 2007. He also provided a brief summary of the wide implications of the decrease in ice cover, including scientific impacts, issues relating to commerce, and national security concerns.

In response to a request from Board Members, Dr. Alexandra Isern, OPP Program Director, provided an update on planning for a polar research vessel, which may be included in the portfolio review of the Subcommittee on Facilities (SCF). She summarized the importance of polar science and vessel capabilities, and described the current status of the polar research vessel fleet.

CPP Task Force on Unsolicited Mid-Scale Research (MS)

Dr. Diane Souvaine, MS chairman, gave a summary of the plans for data and information gathering. The summary included the use of smaller ‘focus groups;’ a possible targeted survey; analysis of NSF budget data in the mid-scale range; and workshop of stakeholders from the research community, NSF, and other agencies. There was general consensus about the plans but a point of caution was raised by Drs. Droegemeier and Benbow on the use of the term ‘focus groups,’ which has specific meaning in the context of social science. It was also suggested to ask a Board Member, and not an external professional, to serve as facilitator of these ‘focus groups’ so that the Board is more closely engaged in the process. The task force plans to hold a teleconference in January 2011 to assess the data gathering efforts.

e. Committee on Strategy and Budget (CSB)

In CSB Open Session, Dr. Suresh provided the committee with an update on the FY 2011 Appropriation process, including the current House and Senate marks. He also compared the FY 2010 Enacted Level with the FY 2011 Request and noted that a full year Continuing Resolution at the FY 2010 level would be 8 percent below the FY 2011 Request. Under this scenario, he identified that the major impacts would be to the Major Research Equipment and Facilities Construction (MREFC) account and NSF staffing. Dr. Michael Van Woert, Executive Officer and Board Office Director, gave an update on the NSB budget by major categories, and noted that it was operating at 90 percent of the FY 2010 budget level. Dr. Van Woert informed CSB that archived Board records were being digitized. Dr. Clifford Gabriel, Senior Advisor, Office of the Director, gave a brief update on the NSF Strategic Plan which is being revised based on input from the Office of Management and Budget (OMB).

In CSB Closed Session, Dr. Marrett presented an update on the FY 2012 budget process. The FY 2012 budget will be submitted to Congress on February 7, 2011.

CSB Subcommittee on Facilities (SCF)

The subcommittee discussed the revised the document, *NSF Principles for Managing the Large Facility Investment*. It was agreed that the principles provide a good foundation for the SCF portfolio assessment. SCF members raised some areas that may require further attention in the document, and NSF will revise the principles based on SCF input and recent NSB discussions on recompetition and thresholds.

The subcommittee also discussed an initial Draft Progress Report that documents the process of the SCF fact-finding work and information provided by NSF. It was noted the subcommittee has developed a better understanding of portfolio assessment through its review of large facilities and will now focus on the overall research infrastructure portfolio.

Dr. Griffiths, SCF chairman, proposed that a timeline be developed from preconceptual design to project decommissioning that identifies decision gates and the information needed at each stage of the process. The meeting ended with a discussion on the next steps for moving forward to the May 2011 meeting.

CSB Task Force on Data Policies (DP)

The task force heard three presentations on Open Access followed by discussion. The presentations were made by: Dr. John Vaughn, Executive Vice President, Association of American Universities, Chair of the U.S. House Roundtable on Scholarly Publishing; Dr. David Lipman, Director, National Center for Biotechnology Information, U.S. National Library of Medicine, National Institutes of Health; and Dr. Bernard Schutz, Director, Max Planck Institute for Gravitational Physics (Albert Einstein Institute), Potsdam, Germany.

The task force discussed plans for its upcoming workshop set for March 27-29, 2011, that will take place in Arlington, Virginia. An orientation and dinner will be held at the Arlington Westin on March 27, and the meetings will be held in the Board Room at NSF on March 28 and 29. The next steps are to review the list of invitees, get feedback from task force members by December 15, 2010, and send invitations before the end of the calendar year.

f. Task Force on Merit Review (MR)

The task force discussed some of the complicated issues surrounding the Broader Impacts merit review criterion. The task force then reviewed the progress of plans to elicit input from various stakeholder groups, including NSF senior leaders, university associations, NSF program directors and division directors, NSF Advisory Committee members, as well as NSF Principal Investigators (PIs) and reviewers. Interviews with NSF senior leaders are nearly complete, with the rest of the activities underway. The task force also reviewed and approved posting a Web site that will allow all interested members of the community to submit comments to NSF, and be publicized through the use of a Dear Colleague Letter (DCL) sent from Dr. Bowen. Additionally, the task force reviewed and approved a draft DCL, subject to minor changes. The task force closed its discussion by reaffirming its commitment to keep all options for potential outcomes on the table, including a complete rewrite of the criteria, and to have its review completed in a timely way.

[signed]
Michael L. Van Woert
Executive Officer