

MEMORANDUM TO MEMBERS AND CONSULTANTS OF THE NATIONAL SCIENCE BOARD

SUBJECT: Summary Report of the May 10-11, 2011 Meeting

The major actions and approvals of the National Science Board (Board, NSB) and a preliminary summary of the proceedings at the Board's May 2011 meeting are provided. This memorandum is also made available for public review. The minutes of the Plenary Open Session for the May 2011 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 419th NSB Meeting (not in priority order):

- a. The Board authorized the NSF Director, at his discretion, to make an award to the Incorporated Research Institutions for Seismology (IRIS) for renewed support of the seismology facilities and programs operated by IRIS. (NSB-11-28)
- b. The Board authorized the NSF Director, at his discretion, to make an award to Michigan State University for support of the National Superconducting Cyclotron Laboratory (NSCL). (NSB-11-29)
- c. The Board authorized the NSF Director, at his discretion, to make an award to the University of Illinois, Urbana-Champaign for support of *XSEDE: eXtreme Science and Engineering Discovery Environment*. (NSB-11-30)
- d. Drs. Kelvin Droegemeier and Diane Souvaine were elected to 2-year terms, May 2011 - May 2013, as members of the Executive Committee.
- e. The Board accepted the 2010 Annual Report of the Executive Committee as presented by the committee chairman, Dr. Subra Suresh, NSF Director (NSB/EC-11-3).
- f. The Board approved forwarding the STEM Education Priority Action Items List to the NSF Director for his consideration.
- g. The Board approved the release of the revised Merit Review Principles and Review Criteria for broader discussion inside and outside of NSF.
- h. The Board approved the transmittal letter and management response for the NSF Office of Inspector General, *Semiannual Report to Congress, March 2011*.

- i. The Board Chairman discharged the *ad hoc* Committee on Honorary Awards with thanks to Dr. France Córdoba, chairman, and Drs. Bud Peterson and Richard Thompson, members.
- j. The Board Chairman discharged the *ad hoc* Committee on Nominating for NSB Elections (Elections Committee), with thanks to Dr. Esin Gulari, chairman, and Drs. France Córdoba and Douglas Randall, members.
- k. The Board Chairman established the *ad hoc* Committee on NSB Nominations for the Class of 2012 – 2018 (Nominations Committee) with Dr. Droegemeier, chairman, and Drs. Córdoba, Peterson, and Randall, members.
- l. The Board approved the minutes of the Plenary Open Session (NSB-11-19) for the February 2011 meeting (<http://www.nsf.gov/nsb/meetings/2011/0215/minutes.pdf>). Minutes for the Plenary Executive Closed (NSB-11-17) and Plenary Closed Sessions (NSB-11-18) for the February 2011 meeting of the Board were also approved.

2. Board Chairman's Report

Dr. Ray Bowen, NSB Chairman, reported on the annual Awards Ceremony and Dinner at the Department of State's Diplomatic Reception Rooms on May 10, 2011, where the Board and NSF were honored to receive a message from President Obama. The following honorary award recipients were recognized for their distinguished contributions:

- ◆ Dr. Charles Vest, President of the National Academy of Engineering and President Emeritus of the Massachusetts Institute of Technology, received the Vannevar Bush Award.
- ◆ Dr. Casey Dunn, a biologist in the Department of Ecology and Evolutionary Biology at Brown University, received the Alan T. Waterman Award.
- ◆ Dr. Moira Gunn, founder of the National Public Radio program, *Tech Nation*, and Managing director of Biotechnology Programs at the University of San Francisco, received the individual NSB Public Service Award.
- ◆ The Exploratorium - the museum of science, art, and human perception in San Francisco - received the group NSB Public Service Award.

The Chairman announced that Drs. Droegemeier and Souvaine were elected to the Executive Committee for the 2011-2013 terms during Plenary Executive Closed Session (See 1.d.). Additionally, the Chairman had three committee announcements (See 1.i.-1.k.)

On the subject of outreach, Dr. Bowen reported that he and Dr. Suresh testified before the House Committee on Science, Space, and Technology on March 11, 2011. He presented concerns about U.S. leadership in science and engineering as well as information on the FY 2012 Budget Request and National Science Board priorities.

The Chairman made the following announcements regarding recent Board Member nomination activities.

- ◆ Dr. Kelvin Droegemeier was confirmed as a Board Member for the Class of 2016. This will be Dr. Droegemeier's second term.
- ◆ Drs. Dan Arvizu and Alan Leshner were nominated for re-appointment by the President, also for the Class of 2016.
- ◆ Dr. W. Carl Lineberger was nominated by the President for the Class of 2016, and replaces Dr. Kathryn Sullivan who was confirmed as an Assistant Secretary of Commerce.
- ◆ Dr. Robert Zimmer was nominated by the President for the Class of 2016, and replaces Dr. Jon Strauss.

Dr. Bowen also announced that Dr. Suresh was awarded the prestigious Padma Shri by the President of the Republic of India. It's one of the highest civilian honors bestowed by the Indian government. Dr. Suresh was recognized for his distinguished work in U.S. science and engineering.

Lastly, Dr. Bowen made the following staff announcements:

- ◆ Ms. Shirley Watt joined the Board Office on a detail (as of April 25). She serves as a Senior Program Analyst, Budget Division, Office of Budget, Finance, and Award Management (BFA), and is the project manager for the NSF annual Agency Financial Report. Ms. Watt will be supporting the Committee on Programs and Plans (CPP).
- ◆ Dr. Elizabeth Strickland left the Board Office (as of March 11), and relocated to New Jersey. She joined the Board Office in March 2006 as a Sigma Xi Fellow, and became a member of the staff in December 2007. Dr. Strickland served as Executive Secretary for the NSB Commission on 21st Century Education in STEM and CPP Board Office Liaison.
- ◆ Mr. Daniel Lauretano, who served as the Legal Counsel to the Board, left to pursue other interests (as of April 28), after serving with the Board for 11 months.

3. NSF Director's Report

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

- ◆ Mr. Alan Blatecky, Head of the Office of Cyberinfrastructure (OCI) (as of March 15, 2011).
- ◆ Dr. Machi Dilworth, Head of the Office of International Science and Engineering (OISE) (as of March 29, 2011).
- ◆ Dr. Farnam Jahanian, Assistant Director, Directorate for Computer and Information Science and Engineering (CISE) (as of March 1, 2011).
- ◆ Mr. Brian Stone, Division Director, Antarctic Infrastructure and Logistics, Office of Polar Programs (OPP) (as of February 27, 2011).

For the congressional update, Dr. Suresh reported on the passage of a full year FY 2011 continuing resolution. NSF was provided with \$6.8 billion, a 1 percent or approximately \$66 million reduction from the FY 2010 level. He reported that he testified at three hearings on the FY 2012 budget request to Congress.

On March 10, 2011, he was the sole witness before the House Appropriations Subcommittee on Commerce, Justice, Science, and Related Agencies. On March 11, 2011, he testified before the Committee on Science, Space, and Technology, along with Dr. Bowen. Additionally, on March 17, 2011, he testified before the Senate Committee on Commerce, Science, and Transportation, along with Dr. John Holdren, Director, Office of Science and Technology Policy (OSTP), Dr. Patrick Gallagher, Director, National Institute of Standards and Technology (NIST), and Dr. Waleed Abdalati, Chief Scientist, National Aeronautics and Space Administration (NASA). Although strong support was expressed for NSF and its mission, members of the committee also sent a clear message on the austerity of this year's budget environment.

4. Board Committee Reports

a. Executive Committee (EC)

Dr. Suresh reported that the committee endorsed the 2010 Annual Report of the Executive Committee, which summarizes the activities from May 2010 to April 2011. [*The full Board subsequently accepted the annual report.*] (See 1.e.)

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

In A&O Open Session, Dr. Pamela O'Neil, Mr. Brandon Stephens, and Ms. Beth Velo gave a data-rich presentation on the FY 2010 Merit Review Report. Ms. Allison Lerner, NSF Inspector General, briefed the committee on Office of Inspector General (OIG) recent activities in support of the OIG community, including work to improve the Small Business Innovation Research (SBIR) program. Ms. Lerner also noted that a new NSF financial statement audit contract was awarded to Clifton Gunderson, whose partner-in-charge, Mr. Sal Ercolano, presented an overview of the audit plan for FY 2011.

Ms. Martha Rubenstein, NSF Chief Financial Officer (CFO), reported on the work her office is doing to assure that there is a successful FY 2011 financial statement audit, and provided updates on financial system modernization and American Recovery and Reinvestment Act (ARRA) reporting. NSF's handling of contingency budgeting and expenditures for large facility construction was also discussed, and the OIG as well as the CFO were asked to discuss this issue at the July 2011 meeting. Dr. Judith Sunley, Interim Chief Human Capital Officer, reported on a number of human capital management activities being undertaken by NSF.

Additionally, the committee voted to recommend approval of the management response and draft transmittal letter for the March 2011 *OIG Semiannual Report to the Congress*. [*The full Board subsequently approved the transmittal letter and management response.*] (See 1.h.)

In A&O Closed Session, the committee discussed a pending procurement and an OIG investigation.

c. Committee on Education and Human Resources (CEH)

In response to several recent STEM education policy reports, the committee approved a motion requesting that the Board forward to Dr. Suresh for consideration a list of three near-term

Priority Action Items for NSF to implement. [The full Board subsequently approved forwarding the STEM Education Priority Action Items List to the NSF Director for his consideration.] (See 1.f.) The committee deferred discussion of potential longer-term responses to these reports until the July 2011 CEH meeting.

The committee discussed strategic directions for NSF's education portfolio. Dr. Carl Wieman, OSTP Associate Director for Science, provided an overview of the newly-formed National Science and Technology Council (NSTC) Committee on STEM Education and its efforts to conduct a detailed inventory of Federal STEM education programs and to develop a 5-year strategic plan for Federal STEM education investments. Dr. Joan Ferrini-Mundy, Assistant Director, Directorate for Education and Human Resources (EHR), provided a brief summary of NSF's ongoing discussions about its STEM education priorities. These joint efforts are expected to lead to a more evidence-based and coherent Federal STEM education portfolio. It was agreed that NSF should take a leadership role in both addressing gaps in the evidence that would inform policy and practice at all Federal agencies, particularly with regard to preparing more effective STEM teachers, and promulgating strategies for effective up-scaling.

d. Committee on Science and Engineering Indicators (SEI)

The committee reviewed Board and expert reviews of chapter drafts. SEI was pleased with the drafts and the authors' plans for revisions in light of reviewer input. Ms. Jean Pomeroy, SEI Board Office Liaison, summarized data on the impact of the *Indicators* Companion Piece and other Board reports. The committee discussed possible avenues for changing the presentation so that the content would reach more people and have more impact. A working group, consisting of Drs. José-Marie Griffiths, Esin Gulari, and Louis Lanzerotti, and Mr. Arthur Reilly, will meet to discuss ideas for a companion piece focused on innovation and workforce issues. The committee approved an overall cover design for *Indicators* 2012 and asked the staff to improve the design by depicting more up-to-date technologies in the background drawings.

e. Committee on Programs and Plans (CPP)

In CPP Open Session, the committee discussed CPP Program Portfolio reviews. A committee working group drafted an outline for a programmatic review process via a conference call prior to the meeting. Several members of the NSF leadership team, including Mr. Michael Sieverts, Director, BFA Budget Division; Dr. Clifford Gabriel, Acting Director, Office of Integrative Activities (OIA), and Drs. Dilworth and Ferrini-Mundy provided feedback to the committee on the draft document. The committee suggested that the discussion be continued throughout the summer, including a possible retreat prior to the July 2011 Board meeting, with both NSF leadership and NSB participating.

Dr. Mark Coles, Deputy Director, Large Facilities Office, gave a presentation on NSF recompetition implementation now subject to the NSB policy. His presentation included the history of recompeted projects and overarching issues with business and administration. As NSF proceeds to fully implement the NSB policy, Dr. Coles noted that NSF's Business and Operations Advisory Committee (BOAC) will be asked to approve formation of an *ad hoc* subcommittee to provide expert advice to NSF on this issue. A written public report will be requested before the end of the calendar year. The committee asked for periodic updates prior to a final report from the subcommittee.

The committee also heard a status update on the National Research Council (NRC) report on the Deep Underground Science and Engineering Laboratory (DUSEL). Dr. Edward Seidel, Assistant Director, Directorate for Mathematical and Physical Sciences (MPS), introduced Dr. Andy Lankford, Chairman of the NRC committee that is writing the report. Dr. Lankford told the committee about the NRC report, including the participants of the working group, and gave highlights of the DUSEL program. However, because the report is currently in review, none of the findings or recommendations could be reported.

Ms. Irene Qualters, OCI Program Director, presented an information item on the new High Performance Computing (HPC) acquisition. Ms. Qualters informed the committee that proposals for a new HPC were due at the beginning of March 2011, and a panel review of proposals was conducted at the end of March. NSF expects to bring an action item before the Board at the July 2011 meeting.

Mr. Blatecky provided an update on the DataNet Program. DataNet awards are partnerships that are responsive to user communities and form coordinated networks to provide national, interdisciplinary data models and infrastructure. Mr. Blatecky noted that DataNet is a key piece of NSF's new Cyberinfrastructure Framework for 21st Century Science and Engineering investment. He also highlighted the impacts of current DataNet awards, and provided some future directions for DataNet in 2011 and 2012.

Drs. Seidel and Thomas Carruthers, MPS Program Director, gave a science update on the Laser Interferometer Gravitational-Wave Observatory (LIGO). LIGO had its last science run in October 2010, and the Advanced LIGO project is expected to come online in 2015. Dr. Carruthers told the committee about the most recent LIGO science run and some of the significant discoveries and advances produced by LIGO during the last few years.

In CPP Closed Session, the committee chairman gave an update regarding an HPC action. The committee heard one information item, an update on the FY 2011 Experimental Program to Stimulate Competitive Research (EPSCoR) Research Infrastructure Improvement Track-1 awards. Additionally, CPP considered three action items and forwarded them to the full Board for approval:

- ◆ Facilitating New Discoveries in Seismology and Exploring the Earth: The Next Decade, Incorporated Research Institutions for Seismology (IRIS)
- ◆ Support of the National Superconducting Cyclotron Laboratory (NSCL), Michigan State University
- ◆ Extreme Science and Engineering Discovery Environment (XSEDE), University of Illinois, Urbana-Champaign

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

CPP Subcommittee on Polar Issues (SOPI)

Dr. Karl Erb, OPP Director, provided an update on the two-phase study of the U.S. Antarctic Program. The first phase is an NRC study that aims to identify drivers and directions of Antarctic science in the next 2 decades. The second phase is a Blue Ribbon Panel that will determine options for meeting the required logistics and infrastructure demands identified in the NRC study. The preliminary NRC report is expected in June 2011 in time to inform the

Blue Ribbon Panel that will begin meeting shortly thereafter. Dr. Erb commented on budget constraints, especially rising fuel costs, and the impact on Antarctic logistics. He noted that due to very severe weather in northern Europe the last two winters, significant sea ice in the Baltic Sea has impeded commercial shipping, casting doubt on the availability of the Swedish icebreaker, *Odin*, for the Antarctic, since it may be needed by Sweden for clearing ice. He also announced that the Korean government is building a research station very close to McMurdo Station near Terra Nova Bay. Finally, Dr. Erb noted that the Interagency Arctic Research Policy Committee, which is chaired by the NSF Director, recently became more active under the coordinating auspices of the President's NSTC with staff support from Dr. Brendan Kelly, Deputy Director, OPP Division of Arctic Science.

Dr. Alexandra Isern, Program Director, OPP Antarctic Earth Sciences, described research at the Central Transantarctic Mountains (CTAM) Camp. Mr. Peter West, Program Manager for Polar Education and Outreach, briefed the subcommittee on new and ongoing education and outreach activities supported by OPP, including PolarTREC, which places K-12 school teachers with researchers in the field; the Antarctic Artists and Writers Program; and the Joint Science Education Project (JSEP), an international collaborative polar science-education effort involving Greenland, Denmark and the U.S.

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

Dr. Droegemeier was welcomed as co-chairman of the task force. Dr. Souvaine reported on the findings of two Discussion Groups that the task force held in February and March 2011. Dr. Sohi Rastegar, MS Executive Secretary, provided a summary of the draft workshop agenda. The workshop will be held at NSF on June 5-7, 2011. Dr. Suresh encouraged the workshop organizers to fully discuss the implications of the budgetary constraints NSF faces, including a potential decrease. Dr. Matthew Wilson, MS Board Office Liaison, provided an update on and walked through several questions of the mid-scale research survey, which he developed with the help of Dr. Fran Featherston, Survey Statistician, Directorate for Social, Behavioral, and Economic Sciences (SBE). The survey is currently under review by the Office of Management and Budget (OMB) review and plans to target a few hundred researchers suggested by vice presidents for research of more than 100 NSF-funded universities.

f. Committee on Strategy and Budget (CSB)

In CSB Open Session, the committee discussed the status of the FY 2011 and 2012 budgets. Mr. Sieverts reported that the FY 2011 budget was officially approved on April 15, 2011, resulting in total NSF funding of \$6.806 billion which is 1 percent below the FY 2010 funding level and 8 percent below the 2011 requested level. Mr. Sieverts reviewed by account the impacts and key issues that would be incurred as a result of the overall decreased funding level for the agency, including a Major Research Equipment and Facilities Construction (MREFC) allocation funded substantially below what was included in the FY 2011 request. CSB discussed interest in ensuring that future NSF solicitations related to recompetitions are fully open competitions. Ms. Rubenstein reported on the status of ARRA funding and reviewed the organizational structure instituted to implement ARRA activities.

In CSB Closed Session, the NSF FY 2013 budget process and long range planning efforts were discussed. Mr. Sieverts highlighted the internal and external parameters and pressures on the FY 2013 budget. Dr. Suresh talked with CSB about long range planning activities.

CSB Subcommittee on Facilities (SCF)

In SCF Open Session, the subcommittee conducted its Annual Portfolio Review of large facilities. SCF examined the facilities portfolio, the policies used by NSF to move large facility projects forward, and an assessment and characterization of the health of the overall portfolio. The discussion included consideration of the goals and context of the review, the categories of facilities considered, the inputs to the review, and the factors considered in portfolio assessment. NSF described its intended changes to the gating process for consideration of horizon projects and solicited Board suggestions. SCF reviewed the information on major multi-user facilities in the NSF Facilities Plan which had been provided to the Board in February 2011, and conducted a discussion with NSF leadership, Associate Directors and Office Heads on issues and challenges pertaining to facilities; and also discussed progress on the mid-scale infrastructure study, which is to be completed by the subcommittee in January 2012.

In SCF Closed Session, NSF presented information on three early-stage facility projects.

CSB Task Force on Data Policies (DP)

The task force discussed preliminary findings of an expert panel Workshop held at NSF on March 27-29, 2011, and a draft summary of the Workshop that recommends NSF support standards and interoperability that will enable data-intensive science. This summary emphasizes the need to recognize and support computational and data-intensive science as a distinct discipline. It also recommends support for data stewardship and cyberinfrastructure to support data-intensive science. NSF liaisons provided an update on activities within NSF related to both open data and open publications. NSF is having ongoing discussions and joint activities with the Max Planck Society of Germany, and is considering a joint statement with that society for the Berlin 9 conference in November 2011.

g. Task Force on Merit Review (MR)

The task force heard a presentation summarizing the major themes that had emerged from all of the data-gathering activities to date. Data were presented related to the strengths and weaknesses of the merit review criteria and how the criteria are being used by principal investigators (PIs), reviewers, and NSF staff. The presentation also included some perspectives from both NSF staff and NSF PIs on how to engage the PIs' institutions in supporting activities designed to have a broader impact. Task force members and several other members of the Board discussed the data and issues that were revealed through these analyses. The task force then had an extended discussion about the draft recommendations document. With the addition of one more principle addressing the importance of assessing the application of the criteria, there was general agreement about the guiding principles. The discussion on the proposed revision of the two criteria was wide-ranging, however the changes focused primarily on describing the review elements underneath each criterion. The task force also briefly discussed issues surrounding

the implementation of the criteria, but felt that it was more appropriate for NSF to develop the implementation plan for applying the revised criteria, taking into account issues identified by the task force.

Following the discussion, the principles and review criteria were revised to incorporate the requested edits. During the Plenary Open Session, the task force chairman made a motion to approve the release of these preliminary documents, subject to final clearance by the Board, not as NSB policy, but as a proposal for broader discussion inside and outside of the Foundation. *[The full Board approved the release of the revised Merit Review Principles and Review Criteria for this purpose.]* (See 1.g.)

[signed]

Michael L. Van Woert
Executive Officer