

**MINUTES¹
OPEN SESSION
382ND MEETING
NATIONAL SCIENCE BOARD**

The National Science Foundation
Arlington, Virginia
October 13-14, 2004

Members Present:

Warren M. Washington, Chair
Barry C. Barish
Ray M. Bowen
Delores M. Etter
Nina V. Fedoroff
Kenneth M. Ford
Elizabeth Hoffman
Douglas D. Randall
Michael G. Rossmann
Daniel Simberloff
John A. White, Jr.
Mark S. Wrighton

Arden L. Bement, Jr., *ex officio*

Members Absent:

Diana S. Natalicio, Vice Chair
Daniel E. Hastings
Jane Lubchenco
Jo Anne Vasquez

Consultants* Present:

Dan Arvizu
Steven C. Beering
Louis J. Lanzerotti
Alan I. Leshner
Jon C. Strauss

Consultants* Absent:

G. Wayne Clough
Kelvin K. Droegemeier
Kathryn D. Sullivan

¹ The minutes of the 382nd meeting were approved by the Board at the December 2004 meeting.

* NSB nominees pending U.S. Senate confirmation

The National Science Board (NSB, the Board) convened in the Open Session at 2:10 p.m. on Thursday, October 14, with Dr. Warren Washington, Chair, presiding (Agenda NSB-04-144). In accordance with the Government in the Sunshine Act, this portion of the meeting was open to the public.

Dr. Washington welcomed the new Consultants to the National Science Board who were Presidential nominees pending U.S. Senate confirmation. Five Consultants attending the October meeting were:

- Dr. Dan Arvizu of Colorado. Executive Director for Energy and Technology at the University of Chicago.
- Dr. Louis J. Lanzerotti of New Jersey. Distinguished Professor Physics, Center for Solar Terrestrial Research, Department of Physics, New Jersey Institute of Technology.
- Dr. Alan I. Leshner of Maryland. Chief Executive Officer, American Association for the Advancement of Science.
- Dr. Jon C. Strauss of California. President, Harvey Mudd College.
- Dr. Steven C. Beering of Indiana. President Emeritus, Purdue University, and former Member of the Board.

Three new Consultants could not attend the meeting:

- Dr. G. Wayne Clough of Georgia. President, Georgia Institute of Technology.
- Dr. Kelvin K. Droegemeier of Oklahoma. Regents' Professor of Meteorology, the Roger and Sherry Teigen Presidential Professor, and Director, Center for Analysis and Prediction of Storms, University of Oklahoma.
- Dr. Kathryn D. Sullivan of Ohio. President and Chief Executive Officer, Center for Science and Industry, Columbus.

AGENDA ITEM 7: Approval of Open Session Minutes, August 2004

The Board APPROVED the Open Session minutes of the August 2004 meeting (NSB-04-141, Board Book Tab 12 F).

AGENDA ITEM 8: Closed Session Items for December 2004

The Board APPROVED the Closed Session items for the December 2004 meeting (NSB-04-143, Board Book Tab 12 G).

AGENDA ITEM 9: Chairman's Report

a. Memorial Service for Dr. Pamela Ferguson

Dr. Washington announced that he planned to attend a memorial service for Dr. Pamela Ferguson who served on the Board from 1998 until the time of her passing earlier this year. The service would be held at Grinnell College where she was a professor and former president.

b. 2005 Retreat, Site-visit, and Meeting

The annual Board retreat, site-visit, and meeting will take place at the University of Texas - El Paso (UTEP) on February 7-8, 2005. Dr. Michael Crosby, Executive Officer, visited UTEP, and is working closely with Dr. Diana Natalicio, NSB Vice Chair, to develop the logistics and agenda for the activities. Dr. Crosby will provide the Board with more specific information on this subject at the December meeting.

c. Chancellors and Presidents of Historically Black Colleges and Universities

Dr. Washington thanked the chancellors and presidents of Historically Black Colleges and Universities (HBCU) for attending the NSB reception, breakfast, and Education and Human Resources Committee meeting to discuss important issues.

d. Dr. Wrighton Introduced Presidential Debate

Dr. Washington noted that on CSPAN, Dr. Mark Wrighton, in his capacity as Chancellor of Washington University, introduced the Presidential debate between President George W. Bush (Republican) and Senator John Kerry (Democrat) on October 8. The debate was held at Washington University in St. Louis, and was one of three Presidential debates during the campaign. The Chair thanked Dr. Wrighton for including in his opening remarks an emphasis on the importance of science and engineering to the Nation.

AGENDA ITEM 10: Director's Report

a. Award to Dr. Washington

Dr. Arden Bement, NSF Acting Director, announced that Dr. Washington was the recipient of the Vollum Award for Distinguished Accomplishment in Science and Technology from Reed College. The award recognized Dr. Washington as a pioneer in the development of computer models for studying climate change. On behalf of the National Science Foundation, Dr. Bement extended congratulations to Dr. Washington.

b. NSF Staff Announcements

Dr. Bement reported on the following NSF staff changes.

Dr. Margaret Cavanaugh began her career as a Senior Executive Service appointment as Deputy Assistant Director, Directorate for Geosciences on June 27, 2004. Dr. Cavanaugh previously served as Program Director in the Division of Chemistry and as a Staff Associate for the Environment, Office of the Director. She received her Ph.D. in Physical Inorganic Chemistry from Catholic University.

Dr. David Campbell replaced Dr. Cavanaugh in the Office of the Director as the Staff Associate for the Environment. Dr. Campbell joined NSF in 1998 from Rider University and served as Program Director in the Division of Elementary, Secondary, and Informal Education in the Directorate for Education and Human Resources. He received his Ph.D. in Biological Sciences from the University of Rhode Island.

Dr. Gary A. Gabriele joined NSF on September 7, 2004 as Director, Division of Engineering Education and Centers. Dr. Gabriele is from Rensselaer Polytechnic Institute where he currently holds the position of Vice Provost and Dean of Undergraduate Education. Prior to this position, he was Associate Dean of Engineering for Academic and Student Affairs, and Director of the Core Engineering Program within the engineering school. He received his Ph.D. in Mechanical Engineering from Purdue University.

Dr. Thomas Brady joined NSF on September 20, 2004 as Director of the Division of Integrative Organismal Biology from the University of Texas - El Paso, where he serves as Dean of the College of Science. During his tenure at the university, Dr. Brady has worked to strengthen the sciences with a primary focus on developing and implementing programs for the retention and graduation of students. He received his Ph.D. in Biology from Yale University.

c. NSF Office of International Science and Engineering

Dr. Bement announced the transfer of the Office of International Science and Engineering from the Directorate for Social and Behavioral Sciences to the Office of the Director. This realignment responds to recommendations contained in two recent NSB reports ([NSB-00-217](#) and [NSB-01-187](#)) that recognize the increasing importance of international engagement in research and education and the need for NSF and the broader U.S. Government to strengthen its focus, coordination, and policy relating to international science and engineering. The Director for the Office of International Science and Engineering will report to the NSF Deputy Director.

d. Nobel Prizes in Science/NSF Connections

Dr. Bement was pleased to inform the Board that NSF supported 6 of the 10 Nobel Prize recipients in science for this year.

Among the Economics laureates, Dr. Finn Kydland and Dr. Edward Prescott were recognized for time consistency problems for formulating economic policy and understanding business cycles. They received the Nobel Prize for work funded by NSF.

In Physics, laureates Drs. David Gross, David Politzer and Frank Wilczek were recognized for developing the theory of the strong force, which binds quarks into protons and neutrons in the nucleus of an atom. They were supported by NSF graduate fellowships while they conducted the Nobel-recognized research. Dr. Gross' support from NSF spans many years.

For Physiology and Medicine, Dr. Richard Axel, who received the Nobel Prize for research on the sense of smell, also received NSF support from the Biological Sciences Directorate. In 1982, Dr. Axel was a recipient of NSF's Alan T. Waterman Award.

Since 1950, Nobel Prizes have been awarded to more than 150 U.S. and U.S.-based researchers who have been supported by NSF grants throughout their careers. Dr. Bement extended congratulations to all the recipients.

e. Congressional Update

Since the Board meeting in August, there were no hearings where NSF witnesses testified. The most significant congressional action had been the Senate mark-up of the VA, HUD and Independent Agencies Appropriations bill for the coming fiscal year. As reported out of the Senate Appropriations Committee on September 21, the bill would provide NSF with \$5.745 billion for FY 2005. This is the amount requested in the President's budget and reflects an increase of \$167 million, up 3 percent from last year's appropriation.

Within this amount the Research and Related Activities (R&RA) account increased by 3.6 percent to \$4.4 billion and the Education and Human Resources (EHR) account is funded at \$929.2 million, a \$9.8 million (1 percent) decrease over FY 2004 appropriated levels. Of particular note, the Math and Science Partnership Program is maintained and funded at \$30 million above the request.

In the Major Research Equipment and Facilities Construction (MREFC) account, the committee provided the requested level of funding for ongoing projects but did not fund new starts. Unlike the House, the Senate did not move the costs associated with IPAs into the Salaries and Expenses account.

Dr. Bement noted that both Chairman Christopher “Kit” Bond and Ranking Member Barbara Mikulski of the Subcommittee on VA, HUD, and Independent Agencies stated to him that NSF’s increase was not what they had hoped for and was far short of the funding path that they both support.

A continuing resolution would fund agencies through November 20. Beyond that date any appropriations bills that have not been signed into law are expected to be included in a continuing resolution that will keep the government operating until the 109th Congress convenes in January 2005.

In other legislative activity, NSF was included in two bills: H.R. 2608, which combined language from the National Earthquake Hazards Reduction Program Reauthorization Act of 2003 and H.R. 3980, the National Windstorm Impact Reduction Act of 2004. Also, on October 10, the Senate passed H.R. 4614, the Department of Energy High-End Computing Revitalization Act of 2004, by unanimous consent. This bill contained a provision requested by NSF to expand the membership of the Astronomy and Astrophysics Advisory Committee.

Finally, the Senate recessed without acting on over 50 pending confirmations of Presidential nominations, including the Board nominees and the NSF Acting Director. The Senate will remain in recess until November 16.

AGENDA ITEM 11: Committee Reports

a. Executive Committee (EC)

Dr. Bement, chairman of the Executive Committee, reported that the Executive Committee discussed the February 2005 Board retreat, site-visit, and meeting. While the agenda is still being formulated, likely topics would be the applications of science and engineering to homeland security, international partnerships in research and education, and learning about the role of NSF in the evolution of a teaching college to a research university serving the Hispanic community, namely, the University of Texas - El Paso.

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

Dr. Wrighton, chairman of the A&O Committee, reported that the committee heard a presentation by Dr. Norine Noonan, Chair of the Advisory Committee on the Government Performance and Results Act (AC/GPRA) Performance Assessment. The AC/GPRA was convened by the NSF to report on the entire NSF operation as a unique activity among Federal agencies. Dr. Noonan reported that the committee unanimously found NSF to demonstrate significant achievement for all indicators in the People, Ideas, and Tools outcome goals and for the merit review indicator of the Organizational Excellence goal.

The committee also concluded that the quality and relevance of the NSF portfolio remained high, largely due to the rigorous competitive review process. The AC/GPRA encouraged the Board to pay special attention to how NSF can best support “bold” or “high-risk” research, and encouraged NSF’s experiments in new organization models such as the Directorate for Biological Science’s Emerging Frontiers virtual division.

The committee discussed the draft Board responses to questions raised by the House Appropriations Committee staff on the use of the Intergovernmental Personnel Act (IPA) for compensation of professional staff at NSF. The NSB Office was requested to revise the draft responses based on this discussion and schedule a public A&O teleconference meeting in mid-November to review those comments and to make recommendations.

Another discussion was held on the strategies for developing a Board position paper regarding recommendations of a National Academy of Public Administration (NAPA) report, *National Science Foundation: Governance and Management for the Future* (April 2004). The Board Office was asked to develop a draft NSB position paper for use by the NSF Acting Director and NSB Chairman as they interface with Congress. The draft position paper would be discussed during the mid-November A&O teleconference.

Mr. Dan Kovlak, who is a member of the NSF audit firm KPMG, presented information on the Sarbanes-Oxley Act and its implications for internal controls at Federal agencies. Mr. Kovlak discussed the requirements on Federal agencies with regard to reporting on internal controls. He expected that Congress will act to increase requirements on Federal agencies and noted that some Federal agencies are already adopting higher reporting standards. The A&O Committee adopted the suggestion to review the internal control environment at NSF and see how it compares with the Sarbanes-Oxley Act. Mr. Kovlak also reported on the status of the NSF financial statement audit, which is on schedule with one potentially significant finding related to post-award monitoring.

Mr. Thomas Cooley, NSF Chief Financial Officer, summarized the history of the cost sharing policy at NSF. The current Board policy has evolved over the past 5 years and was refined in 1999 and 2002 making it very clear that cost sharing is an eligibility criterion rather than a review criterion, and that only for unsolicited proposals will there be the statutory 1 percent cost sharing requirement. After the 2002 clarification, there were some significant decreases in the total amount of cost sharing at NSF.

Over the past 5 years, cost sharing has been reduced from \$500 million per year to \$250 million per year. When analyzing \$250 million, there are some very specific programmatic activities where cost sharing at NSF is still required: instrumentation and infrastructure proposals, materials development and instructional materials development and curriculum development proposals, and proposals for centers.

A new Federal activity, the National Science and Technology Council’s Committee on Science, Subcommittee on Research Business Models called for input from the community about the issues surrounding the Federal academic partnership. Comments from major academic organizations were that the full cost reimbursement partnership was

no longer at the operative positive level. As a result, Federal agencies are currently focusing on the removal of agency policies that provide less than full reimbursement. Mr. Cooley noted that of all Federal agencies, NSF is the only one with an agency - as opposed to statutory – requirement for cost sharing in its proposals. Statutory cost sharing requirements of other agencies, such as the U.S. Department of Agriculture, can be quite high, however.

Given the historical perspective and the new context of the NSF, the senior management made a recommendation to the A&O Committee and the committee proposed to the Board to eliminate program-specific cost sharing requirements at NSF and to keep the statutory 1 percent that is required.

In response to the Board discussion on cost sharing, Mr. Cooley pointed out that the NSF manages the proposal load that comes in to the Foundation as well as many instrumentation programs and so can reduce the advantages of large institutions over small ones. He noted that because the NSF does not require cost sharing does not mean that institutions cannot make other contributions and commitments. The Board currently approves all new programs; and in considering new programs, there are opportunities to make changes or bring something forward to implement an exception where warranted to an established policy. With regard to the impacts on NSF performance that might result from reduced resources due to reduced cost sharing, Mr. Cooley noted that the academic community has been vocal in its concern about NSF cost sharing requirements for many years, and that it will have the opportunity to express itself on impacts of the proposed changed also, if implemented.

In response to a question on implementation plans, Mr. Cooley stated that program announcements already issued would stand. Effective January 1, any new program announcements would conform to the new policy. After the discussion:

The Board APPROVED for implementation early in 2005, a revision to the current Board policy on cost sharing to eliminate NSF program specific cost sharing requirements and require only the statutory cost sharing of 1 percent.

Ms. Kathleen Graham, Office of the Inspector General (OIG), gave a presentation on the FY 2005 audit plan. The audits to be performed over the next year will include: Federally Funded Research and Development Center (FFRDC) employee benefits, management of research results information, and Government purchase cards. Due to the late schedule of the final NSB 2004 meeting and the need to deliver the OIG Semiannual Report to Congress December 1, the Board authorized that approval of the management's response to the OIG Semiannual Report to Congress be moved to a public teleconference of the A&O Committee in November 2004.

The Board AUTHORIZED the Audit and Oversight Committee to approve the management's response to the OIG Semiannual Report to Congress at its teleconference in November.

Lastly, Dr. Wrighton reported that the committee had received a briefing in Closed Session on ongoing activities involving two institutions.

c. Committee on Education and Human Resources (EHR)

Dr. Elizabeth Hoffman, chair of the EHR Committee, reported that EHR had a presentation by the chancellors and presidents of Historically Black Colleges and Universities (HBCU) representing the Science, Technology, Engineering, and Math doctoral-granting “Cluster.” Dr. James Rennick, Chancellor of the North Carolina Agricultural and Technical State University, and spokesman for the Cluster, provided background about the group and how their work links to two recent National Science Board reports on the subject, *The Science and Engineering Workforce – Realizing America’s Potential* (NSB-03-69) and the draft *Broadening Participation in Science and Engineering Faculty* (NSB-04-41).

Dr. Judith Ramaley, Assistant Director for Education and Human Resources (NSF/EHR) reviewed NSF goals and strategies for broadening participation and introduced NSF staff that provided examples of how research and related programs involving human resource development are linked to activities in the NSF/EHR directorate.

Dr. Hoffman mentioned that the RAND report, *The U.S. Scientific and Technical Workforce: Improving Data for Decision-making*, was provided to Board Members and Consultants. This report was the final conference proceedings at the December 2003 Office of Science and Technology Policy (OSTP) Sloan Foundation Workshop on this subject.

The committee discussed revisions to the NSB report, *Broadening Participation in Science and Engineering Faculty* (NSB-04-41), which is the final product resulting from a workshop held August 2003 to identify strategies for increasing diversity of the Nation’s academic science and engineering workforce.

The Board APPROVED for publication the report *Broadening Participation in Science and Education Faculty* (NSB-04-41) subject to final edits by the NSB and EHR chairs.

Dr. Washington thanked the EHR Committee as well as Drs. Barry Barish, Daniel Hastings, Douglas Randall, and Jo Anne Vasquez for their hard work and excellent result. Special recognition was given to Dr. George Langford, former EHR chairman, who helped initiate and guide this activity until the end of his term in May. He also recognized Dr. Robert Webber, NSB Office, for his contributions. Dr. Hoffman added that Dr. Michael Crosby and Ms. Jean Pomeroy of the NSB Office, as well as Dr. Loretta Hopkins, EHR Executive Secretary, were also very helpful.

d. EHR Subcommittee on Science and Engineering Indicators (SEI)

For Dr. Beering, acting chairman of the SEI Subcommittee, Dr. John White reported on the status of the preparation of the 2006 Science and Engineering Report. The subcommittee reviewed and approved the draft chapter outlines for the report and a revised schedule for report production. He noted that the revised schedule would allow for some parallel processing and chapter reviews to move the process forward about a month. The subcommittee is awaiting EHR approval at the revised schedule and will bring it to the Board at the December meeting.

e. Committee on Programs and Plans (CPP)

Dr. Daniel Simberloff, chairman of CPP, reported that the committee heard a report from the Long-lived Data Collections Task Force. Dr. Anita Jones, who participated by telephone, led the discussion. She reviewed the history of the task force, its charge, and the two workshops. The draft report will be distributed to NSF for comments. Those comments will be collected and CPP will hold a teleconference in mid-November to discuss the next draft, which will be presented to the full Board in December for approval with the expectation that the final draft will come to the Board for approval for publication at the February meeting.

The committee discussed new procedures for handling MREFC projects. The committee reviewed a provisionally approved report that includes procedures to identify specific stages for every MREFC project. CPP requested NSF proceed to detail very specific steps that are given in principle in the report, but are not specifically spelled out, and attempt to integrate the proposed mechanism with an annual timeline. NSF will report to CPP at the December NSB meeting on how it may be able to accommodate this proposed timeline. At the recommendation of the CPP Committee:

The Board APPROVED the delegation of responsibility to CPP to further develop the report, and the Foundation will immediately begin to implement the recommendations of the existing report.

f. CPP Subcommittee on Polar Issues (SOPI) [formerly known as Polar Issues (PI)]

Dr. White, chairman of SOPI, reported that there were two major discussion items: an update on the planning for the International Polar Year and the recommendations in the new National Research Council (NRC) report, *A Vision for the International Polar Year*; and an update on the possible difficulty of the U.S. Coast Guard to provide icebreaker support at McMurdo Station in the Arctic. The two Coast Guard icebreakers may be out of service until 2007, and the subcommittee looked at resource combinations to alleviate this situation.

g. CPP *ad hoc* Task Group on High Risk Research (HiRisk)

Dr. Simberloff reported for the *ad hoc* Task Group on High Risk Research. He stated that Dr. Nina Fedoroff, lead HiRisk, summarized the recent NSB Workshop: Identifying, Reviewing, and Funding Transformative Research, held in Santa Fe, New Mexico on September 22-23. She distributed a summary of the actions and draft recommendations to the CPP. In December, CPP will recommend to the full Board the creation of a formal task force on transformative research to further examine NSF's ability to identify, evaluate, and fund transformative research.

h. Committee on Strategy and Budget (CSB)

Open Session

Dr. Ray Bowen, chairman of CSB, reported that the committee heard a status report from the NSF Acting Director on the 2005 budget.

Closed Session

The committee discussed the FY 2006 budget request as well as the impact of that request on ongoing Foundation planning activities.

AGENDA ITEM 12: Presentation by Dr. John Brighton

Dr. John Brighton, Assistant Director for the Directorate for Engineering, gave a presentation, "View of the Engineering Workforce," that was earlier presented to the House Caucus on Research and Development. The presentation compared and contrasted science and engineering. Dr. Brighton discussed the trends in engineering education and included data on engineering demographics over the past 50 years. He highlighted workforce-related issues and presented several conclusions for the future of engineering.

Dr. Washington adjourned the Open Session at 3:40 p.m.



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