

NSB-00-222

FINAL MINUTES¹
OPEN SESSION
361st MEETING
50th ANNIVERSARY MEETING
NATIONAL SCIENCE BOARD

The National Science Foundation
Arlington, Virginia
December 14, 2000

Members Present:

Eamon M. Kelly, Chairman
Anita K. Jones, Vice Chair
John A. Armstrong
Nina V. Fedoroff
Pamela A. Ferguson
Mary K. Gaillard
M.R.C. Greenwood
Stanley V. Jaskolski
George M. Langford
Joseph A. Miller, Jr.
Robert C. Richardson
Michael G. Rossmann
Vera Rubin
Luis Sequeira
Bob H. Suzuki
Richard Tapia
Warren M. Washington
John A. White, Jr.

Rita R. Colwell, NSF Director

Members Absent:

Jane Lubchenco
Diana S. Natalicio
Maxine Savitz
Daniel Simberloff
Chang-lin Tien

Consultant Absent:

Mark S. Wrighton

¹ The minutes of the December 2000 meeting were approved at the 362nd meeting, March 15, 2001.

The National Science Board (NSB) convened in Open Session at 1:15 p.m. on Thursday, December 14, 2000, with Dr. Eamon Kelly, Chairman of the Board, presiding (Agenda NSB-00-201). In accordance with the Government in the Sunshine Act, this portion of the meeting was open to the public.

AGENDA ITEM 7: Open Session Minutes, October 2000

The Board APPROVED the Open Session minutes of the October 2000 meeting (NSB-00-194, Board Book Tab C).

AGENDA ITEM 8: Closed Session Items for January 31, February 1, 2001

The Board APPROVED the Closed Session items for the January/February 2001 Board Meeting (NSB-00-198, Board Book Tab D).

AGENDA ITEM 9: Closed Session Items for March 14-15, 2001

The Board APPROVED the Closed Session items for the March 2001 Board Meeting (NSB-00-208, Board Book Tab E).

AGENDA ITEM 10: Chairman's Report

a. Acknowledgment of 50th Anniversary Meeting

Dr. Kelly thanked members of the Board and National Science Foundation (NSF) staff who contributed to the success of the 50th anniversary meeting and dinner.

b. Task Force Membership

Dr. Kelly announced that Dr. Michael Rossmann has agreed to serve on the Infrastructure Task Force.

c. February Retreat

Dr. Kelly advised the Board that during the February retreat at Airlie House, the focus would be on three items: transition activities, the NSB election process, and a self-assessment of the Board's oversight and advisory responsibilities. He announced that a committee chaired by NSB Vice Chair Anita Jones and the chairs of the three standing committees (Drs. John Armstrong, Stanley Jaskolski, and Bob Suzuki) would put together the agenda for the retreat. Under consideration is the use of a facilitator at the retreat. Board members were encouraged to submit their ideas and suggestions to Dr. Jones.

d. Meeting with OMB Officials

Dr. Kelly informed the Board that he, Dr. Jones, and Dr. Marta Cehelsky, NSB Executive Officer, met with Office of Management and Budget (OMB) officials, at OMB's request, on December 12. They informally discussed the need to increase the size and duration of NSF awards, various NSF initiatives, issues for the transition, and the charges of the Board's task forces. OMB staff expressed special interest in priority setting and budget processes.

AGENDA ITEM 11: Director's Report

a. NSF Distinguished Service Award

Dr. Rita Colwell, NSF Director, presented the NSF Distinguished Service Award to Dr. Ruzena Bajcsy, Assistant Director, Directorate for Computer and Information Science and Engineering, for her exceptional performance in leading the Interagency Information Technology Research Initiative and her dedication and leadership in advancing the mission of NSF.

b. Congressional Update

Dr. Colwell reported that the Veterans Administration (VA), Housing and Urban Development (HUD), and Independent Agencies appropriations bill was signed into law on October 27. Congress has been recalled into session to address appropriation bills not yet enacted, and there is a possibility that the final agreement may involve an across-the-board cut of all appropriation bills, totaling \$1 billion.

Dr. Colwell also reported that the National Science Education Act of 2000, introduced by Representative Vern Ehlers, failed to pass and is expected to be reintroduced in the 107th Congress.

Since the last Board meeting, NSF staff have provided briefings to Senate staff on the Nanoscience and Technology Initiative and EPSCoR (Experimental Program to Stimulate Competitive Research), to the Black Congressional Caucus and Hispanic Caucus on NSF programs serving underrepresented groups, and to House and Senate staff on the recent update of the Third International Mathematics and Science Study (TIMSS-R) report.

c. Press Conference on Arabidopsis

Dr. Colwell reported that the press conference on the genetic sequencing of the plant arabidopsis was successful and that the sequencing was an example of superb interagency collaboration and cooperation. Dr. Colwell commended the Office of Legislative and Public Affairs for webcasting the press conference, making information on this plant genetics milestone immediately available on the World Wide Web.

AGENDA ITEM 12: NSF Public Affairs Advisory Committee

Dr. Colwell commented on the importance of the Public Affairs Advisory Committee (PAAC), which is helping NSF understand how to convince the public, elected officials, and the media that science and engineering research and education are truly vital to the Nation's future. She introduced Mr. Frank Mankiewicz, chair of PAAC and a distinguished journalist, former press secretary to the late Senator Robert Kennedy, and former president of National Public Radio. He is now vice chairman of Hill & Knowlton, one of the largest public relations firms in the United States.

Mr. Mankiewicz introduced four committee members present: (1) Mr. Alfred R. Berkley III, vice chairman of NASDAQ and chairman of The Community of Science, (2) Mr. Philip Merrill, chairman and publisher of The Washingtonian Magazine and owner of several newspapers, (3) Ms. Edie Magnus, a correspondent and television journalist at Dateline NBC, and (4) Dr. Richard Tapia, an NSB member. The purpose of PAAC is to suggest ways in which NSF can enlarge its visibility so as to garner far greater support from the American public, opinion leaders, members of Congress, congressional staff, and the executive branch. PAAC has recommended five actions: (1) a major outreach effort to explain how science and engineering are related to the Nation's future, economic prosperity, jobs, and societal goals of environmental quality, public health and safety; (2) a vastly expanded outreach effort to the media so that NSF becomes known as the authoritative place to call when scientific events need explanation; (3) an outreach effort to opinion leaders in industry, commerce, labor, religion, and other elements of society to explain why science is important to economic growth; (4) support for U.S. efforts to develop its own talent for high-skill technical jobs; and (5) doubling the NSF budget for the core activities of a public affairs program.

Discussion: In response to questions from the Board, Mr. Mankiewicz and the other PAAC members made the following points:

- National television draws the biggest audiences but the bar is higher for getting attention. Local television stations are often looking for news stories. The trick is to make a connection—going backward from the great discoveries to trace their roots, and going forward to show where the great discoveries might lead. Imagination is needed to make the jump from science to nonscientific but equally important aspects of American life.
- When new journalists begin covering the science beat, NSF could become their unbiased teacher and take them through the pros and cons of issues they will be dealing with.
- NSF could create useful, easily accessible information, such as a visible site on the World Wide Web, or 30-second to 1-minute stories available on satellite for any radio station to use for free.
- For maximum effectiveness, the majority of NSF's outreach should focus on NSF's core constituency, which could mobilize to generate broad support for NSF activities.
- The public perception of science and scientists needs to change. It is essential to demystify science to ensure that the ordinary people, especially children, understand

its relevance. For example, scientists and engineers could help movie producers bring a more realistic picture of science into the film and entertainment industry.

- NSF needs brand recognition in the nonscientific community, a way to convey the connection between what NSF does and the people it affects.

Dr. M.R.C. Greenwood, who chaired the Board's activity on communication and outreach earlier in the year, noted that it might be useful to explore the connection between the PAAC report and the Board's recent report on communicating science. Scientists need to help the media make connections between science and everyday life, and the media need to help scientists understand audiences. Scientists also need to communicate the glamour, excitement, and rewarding life of a first-rate scientist and to sell the idea that scientists participate in activities that affect every member of society and America's chief social goals.

AGENDA ITEM 13: COSEPUP Postdoc Study

Dr. Kelly introduced Dr. Bruce Alberts, president of the National Academy of Sciences, chair of the National Research Council, and a respected biochemist and professor, to present the findings of the Committee on Science, Engineering and Public Policy (COSEPUP) regarding the postdoctoral experience.

After summarizing recent studies and reports of the three academies, Dr. Alberts described the approach of COSEPUP to broad issues of public policy, the conduct of science, and the training of young scientists. Dr. Alberts introduced *Enhancing the Postdoctoral Experience for Scientists and Engineers*, the latest study undertaken with the goal of encouraging the development of the best young scientists. Based on focus groups, workshops, surveys, and data analyses, the study summarizes the current postdoctoral situation, reports on best practices, and recommends actions for all stakeholders. Dr. Alberts added that research is still needed to explain why the best and brightest students are not choosing to go into science and engineering.

Dr. Alberts reported that the number of postdoctoral appointments has doubled in the past 20 years to approximately 52,000. Eighty percent are in academia—three-fourths of them in the life sciences—and the median salary is \$27,000, less than the median salary of a bachelor's degree recipient. Large numbers of postdocs have no benefits, such as health insurance, and their income is low because the appointment is considered an apprenticeship to gain skills for future advancement. Advisors therefore have a responsibility to teach those skills and evaluate the postdoctorals' progress. Institutions have a responsibility to pay attention to their postdoctoral staff, encourage them financially, and support a postdoctoral association to give them a voice. Funding organizations must take more responsibility for adequate stipend levels and create incentives for good mentoring. Disciplinary societies can catalyze and support reform.

The report encourages NSF and the National Institutes of Health to establish central offices for postdoctoral issues, develop rational criteria for a postdoctoral pay scale,

formulate a standard definition of a postdoctoral appointment, and meet regularly with representatives of postdoctoral organizations.

AGENDA ITEM 14: NSF and the Social Sciences

Dr. Norman Bradburn, Assistant Director, Directorate for Social, Behavioral and Economic Sciences, summarized an initiative under consideration for the 2003 budget. Many changes occurring in society are largely driven by technology, and technology provides new research tools that open new avenues of research in social and behavioral sciences. Examples of new tools and methodologies are non-invasive methods for studying brain functions, stochastic modeling of human interactions, computational linguistics, new statistical techniques for data mining and data analysis, and laboratories.

In discussions with research universities, professional societies, and review panels, NSF has identified a number of illustrative research questions:

- How do our institutions and systems of laws, property rights, and regulations stimulate or inhibit technological innovation and diffusion, particularly as analyzed in economics and political science?
- How can international development of new technologies and commerce be effectively governed in the global context?
- What happens in the brain as we learn and mature and how does knowledge of “what happens” contribute to improve learning, memory, and other cognitive skills?
- How is meaning encoded in language (an analog of the genome question in biology)?
- How can we use technology to transform education?
- What transformations are required of organizations to remain competitive in the context of changing products, markets, and required skills?
- How do we explain the sudden emergence of collective behavior such as rapid, widespread adoption or opposition to technologies?
- How can we design markets to allocate efficiently new types of goods and services where traditional market designs have failed?

The initiative might be organized around four themes: (1) innovation and diffusion; (2) incorporating human factors in the beginning of processes to develop and adapt technology; (3) adaptation to technological change; and (4) social, economic, and environmental effects of technology (direct effects, cumulative effects, and second- and third-order effects).

Discussion: Dr. Jones noted that new tools and techniques are the compelling argument for the initiative at this time. Dr. Armstrong noted the need for better scholarly understanding and modeling of the link between scientific advances and economic growth—a harder question to answer than many of the questions already noted. Dr. Kelly suggested that a conceptual framework for the initiative could be the gap between social science and public policy, and the opportunity that now exists for synergy among problems, databases, technologies, and statistical techniques. This could be the beginning of a new era in social science and its relationship to public policy, but policy

makers will need to be convinced that scientific research in the social sciences is more useful and better than intuition in setting public policy. Dr. Greenwood noted that the name selected for the initiative will be important in gathering support from the community outside NSF. Dr. Robert Richardson stated that the Federal agencies that have large databases may not be used to academic analysis and publication and may need to be convinced to cooperate.

AGENDA ITEM 15: NSB Report: NSF International Activities

Dr. Armstrong reported on behalf of Dr. Diana Natalicio, chair of the Task Force on International Issues in Science and Engineering. The interim report for the new Administration, "Toward a More Effective U.S. Role in International Science and Engineering" (NSB-00-206), was approved by the Executive Committee on November 22.

The task force was now recommending NSB approval of a second report, "Toward a More Effective NSF Role in International Science and Engineering" (NSB-00-217). Dr. Kelly noted that Board approval of this interim report is needed for budget planning and to start programmatic activities. Later the report will be broadened to include a full literature review and other elements. After approval, the interim report will be posted on the NSB website.

The Board APPROVED the interim report on NSF's role in international science and engineering.

Dr. Armstrong noted that the task force was greatly aided by the expert assistance of its executive secretary, Dr. Alan Rapoport.

ADENDA ITEM 16: Committee Reports

[The Chairman called for committee, subcommittee, and task force reports in the following order, to accommodate travel schedules.]

a. Executive Committee (EC)

Dr. Colwell reported that during its teleconference on November 22, the committee approved the draft report "Toward a More Effective U.S. Role in International Science and Engineering." The committee also approved, subject to final edits under the authority of the NSB Chair, the NSB management response to the Inspector General's *Semiannual Report to Congress*.

b. Task Force on International Issues in Science and Engineering (ISE)

Dr. Armstrong, on behalf of Dr. Natalicio, reported that the task force met with Dr. Norman Neureiter, the new Science and Technology Advisor to the Secretary of State,

and his deputy. Dr. Neureiter welcomes interactions with the Board and Foundation and has received strong support from the scientific community.

c. Committee on Programs and Plans (CPP)

Dr. Armstrong, committee chair, reported that the committee heard a presentation on NSF's planning for scientific ocean drilling after present international agreements end in 2003. As specific plans develop, they will be brought before CPP and the Board. The committee also heard a report on the external review of the management of Associated Universities for Research in Astronomy. As part of its periodic updates on environmental activities, the committee heard from Dr. Margaret Leinen, Assistant Director, Directorate for Geosciences, on recent progress. The committee endorsed the work plan and schedule presented by the Task Force on Science and Engineering Infrastructure.

CPP Subcommittee on Polar Issues (PI)

Dr. Warren Washington, chair, reported that the subcommittee received information on climate system science, origins of the universe, polar ecosystems, the impact of global climate change, and icebergs from the Ross Ice Shelf. The subcommittee also received a report on the Joint Global Ocean Flux study, a biological, chemical, and physical study of the carbon cycle in the Southern Ocean. Dr. Washington reported that the Navy will no longer monitor the thickness of the Arctic sea ice; automatic remote vehicles are being developed to perform that important monitoring. The subcommittee also heard about issues at the South Pole, including improved health and safety.

CPP Task Force on Science and Engineering Infrastructure (INF)

Dr. John White, chair, reported that the task force will focus on infrastructure linked to NSF support: academia, national laboratories, Federally funded research and development centers, and private industry. For some fields, it would include infrastructure in other countries. The work plan has four tasks: to assess the current infrastructure using readily available information; to identify the information gaps that exist and recommend plans for filling those gaps; to focus on both traditional and new and emerging infrastructure; and to assess the current policy and management framework. The task force proposes to complete its work in mid 2002.

d. Audit and Oversight Committee (A&O)

Dr. Jaskolski, chair, reported that Mr. Tim Cross, newly appointed as Deputy Inspector General, was introduced to the committee. Mr. Thomas Cooley, Director, Office of Budget, Finance and Award Management, reported on NSF pro-active compliance issues, such as facilities management, management of large projects, cost-sharing, and risk assessment. Mr. Cooley also reported on the Management Control Committee's work on the Federal Managers Financial Integrity Act. Ms. Linda Massaro, Director, Office of Information and Resource Management, reported on the recent chartering of an NSF Business and Operations Advisory Committee to advise the Chief Financial Officer and

the Chief Information Officer. The committee received a report on electronic signatures and steps being taken to make the proposal and award process paperless, as well as an update on NSF financial statements and audits and Government Performance and Results Act (GPRA) activities. In a supervisory session, Dr. Christine Boesz, Inspector General, discussed the management challenges letter that she was requested to prepare for the Senate Committee on Government Affairs.

e. Committee on Education and Human Resources (EHR)

Dr. Suzuki, chair, reported that the committee recommended approval of the Doctoral Data Project, which was presented in Closed Session. The committee approved the work plan and schedule presented by the Task Force on National Workforce Policies for Science and Engineering. The majority of the committee meeting was devoted to a discussion of the NSF niche in K-16 education and plans for completing a report on associated policy issues. Ms. Clara Tolbert and Dr. Karl Pister, consultants to the GPRA subcommittee and the EHR Advisory Committee, summarized what they saw as the key issues raised in previous discussions. Dr. Judy Sunley, interim assistant director, EHR Directorate, described the set of principles that set the context for defining the NSF niche and her view of key issues. Dr. Susan Millar, a member of the EHR Advisory Committee, offered her perspective on how NSF could more effectively transfer project results to practitioners. The subsequent discussion ranged from the leveraging of NSF's limited dollars to the role of pedagogy in institutions of higher education. A proposed outline for the committee's report was approved, and the committee intends to submit its report to the Board at the March meeting.

EHR Subcommittee on Science and Engineering Indicators (S&EI)

Dr. Tapia, chair, reported that the subcommittee approved four revised chapter outlines and directed Science Resources Studies staff to proceed with drafting. All eight chapter outlines have now been approved. These of special concern are the chapters on the workforce and K-12 education. Draft chapters will be available for Board review no later than April and May 2001, at the rate of two chapters per week. Looking ahead to the 2004 Indicators, Dr. Rolf Lehming, Program Director, Integrated Studies Program, will provide a work plan for a new chapter on the environment for discussion in March 2001.

EHR Task Force on National Workforce Policies for Science and Engineering (NWP)

Dr. Suzuki reported for Dr. Joseph Miller, chair, that the task force agreed to focus on issues for which there is a sound empirical base. Three core issues are (1) immigration and graduate training, (2) math and science teachers, and (3) continuous skill and knowledge development. A day-long briefing of the task force is tentatively scheduled for January 30 on various workforce-relevant databases and gaps in knowledge.

f. Committee on Science and Engineering Policy Issues (SPI)

Dr. Kelly, chair, reported that Mr. Frank Cushing, chief of staff of the House Appropriations Committee, met with the committee to discuss the process for producing the Federal research budget and the need for scientific input to inform Congressional allocation decisions. The committee then worked toward consensus on a mechanism for scientific input into allocation decisions. A revised draft document will be prepared to reflect committee discussion, and it will be circulated to the committee for comment, then to the entire Board for comment in advance of the NSB policy symposium on January 31 and February 1.

g. Task Force on the NSB's 50th Anniversary

Dr. Vera Rubin, chair, summarized the task force's activities throughout the 50th anniversary year: cosponsoring JumpStart 2000, a student team competition, with *Parade* and *react* magazines and the White House; naming an asteroid *Scientia* in cooperation with its discoverers; producing the Board's commemorative booklet, *The National Science Board: History and Highlights, 1950-2000*; and organizing the gala dinner held on December 12. Dr. Rubin thanked Dr. Kelly for his support, members of the task force (Drs. Jane Lubchenco, Tapia, Washington, Sandy Greenberg and Eve Menger), and a number of NSF and Board staff: Dr. Marta Cehelsky, Dr. Daryl Chubin, and Ms. Susan Fannoney of the Board Office; Ms. Susan Mason, Ms. Janell Richardson, Mr. William Line, and Mr. Michael Sieverts of the Office of Legislative and Public Affairs; Mr. James Caras and Mr. Chris Gordon of Administrative Services.

Dr. Kelly thanked Dr. Rubin for her leadership of the 50th anniversary events.

AGENDA ITEM 17: Other Business

After thanking the many NSF staff members who helped prepare for the meeting, Dr. Kelly adjourned the Open Session at 3:50 p.m.

Janice E. Baker
Policy Writer/Editor