

**APPROVED MINUTES¹
OPEN SESSION
410TH MEETING
NATIONAL SCIENCE BOARD**

National Science Foundation
Arlington, Virginia
August 5-6, 2009

Members Present:

Steven C. Beering, Chairman
Patricia D. Galloway, Vice Chairman
Mark R. Abbott
Dan E. Arvizu
Barry C. Barish*
Camilla P. Benbow
Ray M. Bowen
John T. Bruer
Kelvin K. Droegemeier
Esin Gulari
Elizabeth Hoffman*
Louis J. Lanzerotti
G. P. "Bud" Peterson
Douglas D. Randall
Arthur K. Reilly
Diane L. Souvaine
Jon C. Strauss
Kathryn D. Sullivan
Thomas N. Taylor

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

Members Absent:

G. Wayne Clough
France A. Córdova
José-Marie Griffiths
Alan I. Leshner
Richard F. Thompson

¹ The minutes of the 410th meeting were approved by the Board at the September 2009 meeting.

* Consultant

The National Science Board (Board, NSB) convened in Open Session at 1:05 p.m. on Thursday, August 6, 2009 with Dr. Steven Beering, Chairman, presiding (Agenda NSB-09-61, Board Book page 227). In accordance with the Government in the Sunshine Act, this portion of the meeting was open to the public. This session, like all Open Sessions, was televised on closed-circuit television within the NSF building.

AGENDA ITEM 6: Director's Award for Collaborative

Dr. Beering and Dr. Arden Bement, NSF Director, presented the Director's Award for Collaborative Integration for the "NSB-OLPA Public/Congressional Affairs Team." This collaborative award recognized staff members in the Office of Legislative and Public Affairs (OLPA) and the Board Office for outstanding accomplishments in communicating the work of the Board to the public and Congress. From OLPA: Ms. Teresa Davies, Mr. Tony Gibson, and Ms. Lisa-Joy Zgorski, (Ms. Karen Pearce was not present at the award presentation); and from the Board Office: Ms. Jennie Moehlmann, Ms. Beverly Sherman, and Ms. Kim Silverman.

Additionally, Dr. Beering recognized Dr. Matthew Wilson for his outstanding service to the Board Office. As an American Association for the Advancement of Science (AAAS) Fellow, Dr. Wilson was not eligible for a Director's Award; however, he was a contributor to the Board's outreach activities, including the creation of the Board's Wikipedia page. Dr. Wilson had also been supporting the "Expert Panel Discussion on preparing the Next Generation of STEM Innovators," scheduled for August 24-25, 2009. Dr. Beering also announced that the AAAS Fellowship for Dr. Wilson was renewed for another year.

AGENDA ITEM 7: Approval of Open Session Minutes, May 2009

The Board unanimously APPROVED the Open Session minutes of the May 2009 Board meeting (NSB-09-54, Board Book page 251).

AGENDA ITEM 8: Chairman's Introduction and Report

In the Chairman's Introduction on Wednesday, August 5, 2009 and during the Chairman's Report of the Plenary Open Session on Thursday, August 6, 2009, Dr. Beering announced and reported on several items.

a. Closed Session Items for September 2009

The Board unanimously APPROVED the Closed Session items for the September 24, 2009 meeting (NSB/EC-09-15, Board Book page 183).

b. NSF Authorization Act of 2002, Section 14

Dr. Beering reported that the NSF Authorization Act of 2002, Section 14 requires that the Board report to Congress the condition of any delegation of authority that relates to funds appropriated for any project in the Major Research Equipment and Facilities Construction (MREFC) account.

He will be reporting to Congress that there had been no delegation of authority related to MREFC funds, during the last year. The report is due September 15, 2009.

c. Board Meeting Calendar for 2010

At the May 2009 meeting, the Board approved the meeting dates slated for February, May, August, and September 2010. The proposed suggested dates for the December 2010 meeting created conflicts with some Board members. The Board Office re-pollled the Board Members for a new proposed meeting date of December 1-2, one day earlier time than previously planned.

The Board unanimously APPROVED the meeting date of December 1-2, 2010 to be added to the Board schedule of meetings for 2010. (NSB-09-42, Board Book page 279) (Appendix)

d. Candidate Sites for 2010 Retreat and Off-Site Meeting

Dr. Beering announced that the Board will soon be considering locations for next year's off-site meeting and retreat to take place September 23-24, 2010 and asked that Board Members give suggestions to Dr. Craig Robinson, Acting Executive Officer and Board Office Director. The Board will vote on the location of the 2010 off-site meeting and retreat at the December 2009 meeting.

e. 2009 Retreat and Off-Site Meeting at The Ohio State University

Dr. Kathryn Sullivan, who serves as the Director for the Battelle Center for Mathematics and Science Education Policy at the John Glenn School of Public Affairs for The Ohio State University, reported on the planned schedule for the Board retreat and off-site meeting on September 23-24, 2009 (same days as in 2010). The Board retreat will be held on September 23 at Page Hall, which includes a museum for many of John Glenn's space artifacts as well as his personal papers, and Dr. Gordon Gee, President of The Ohio State University, will host a gathering at the newly renovated main campus library, the William Oxley Thompson Library. The Board meeting will be held on September 24 followed by visits to NSF-funded projects at the university and the Center of Science and Industry (COSI).

f. Expert Panel Discussion on the Next Generation of STEM Innovators

The Board's "Expert Panel Discussion on the Next Generation of STEM Innovators" will take place on August 24-25, 2009 at NSF. The over-arching goal of the project is to identify and develop highly talented and highly motivated students, who will become the future leaders in STEM disciplines. A diverse group of experts from multiple disciplines were selected to form the various panels. NSF and NSB will be well represented at the discussion, and the U.S. Secretary of Education, Mr. Arne Duncan, accepted the Board's invitation to provide the keynote address on August 25. Following the expert panel discussion, the Board's Committee on Education and Human Resources (CEH) will produce a white paper with recommendations for consideration by the Board.

g. New NSB Publications

Dr. Beering announced that the Board had two new published reports. One report is a result of the Committee on Strategy and Budget's (CSB's) Task Force on Cost Sharing (CS) entitled, *Investing in the Future: NSF Cost Sharing Policies for a Robust Federal Research Enterprise* (NSB-09-20). The other report is from the Committee on Programs and Plans' (CPP's) Task Force on Sustainable Energy (SE) entitled, *Building a Sustainable Energy Future: U.S. Actions for an Effective Energy Economy Transformation* (NSB-09-55). Both reports offer Board recommendations, and will be distributed to Congress, the Office of Science and Technology Policy (OSTP), and then placed on the NSB Web site. Additionally, a pamphlet, *National Science Board Members 2009* (NSB-09-68), also known as the Board "Photobook," was recently printed and will also be distributed and posted on the NSB Web site.

h. New Board Web Site

A new Board Web site was launched that emphasizes the Board's policy reports and works to make these reports appear more prominently in Web search engines. Visit:

<http://www.nsf.gov/nsb/>

i. Congressional Testimony

The Chairman also reported that Dr. Kelvin Droegemeier testified before the Senate Committee on Commerce, Science, and Transportation on July 28, 2009 for the hearing on "Weathering the Storm: The Need for a National Hurricane Initiative." As co-chairman of the former Task Force on Hurricane Science and Engineering (HSE), he presented information to the Senate on the importance of hurricane research.

j. Committee Announcements

Dr. Beering established the *ad hoc* Committee on Honorary Awards. This new *ad hoc* committee will work on the Vannevar Bush Award and the NSB Public Service Awards. He asked Board Members to contact Dr. Robinson if they would like to serve on this committee.

Also, Dr. Beering discharged the *ad hoc* Committee on Nominations for NSB Class of 2010 to 2016 (NOMS), with special thanks to Dr. Alan Leshner, chairman; and Dr. Patricia Galloway and Mr. Arthur Reilly, members.

k. Board Office Staff Departures

Dr. Beering thanked Mr. Evan Clinton, a student employee who will attend Virginia Tech in the fall, for his good work as part of the Board Office staff during the past few months.

Last, but not least, Dr. Beering announced the departure of Ms. Tami Tamashiro, who would leave the Board Office to start Ph.D. studies in neuroscience. Ms. Tamashiro was a Science Assistant in the Board Office since November 2006, and served as the Executive Secretary for both the Task Force on International Science (INT) and the Task Force on Sustainable Energy (SE). Dr. Beering thanked her for her excellent work and wished her good luck in all her future endeavors.

AGENDA ITEM 9: Director's Report

Dr. Arden Bement, Jr., Director of the National Science Foundation (Foundation, NSF), reported on the following items.

a. NSF Staff Introductions

Dr. Robert Trew joined NSF as Division Director, Division of Electrical Communications and Cyber Systems (ECCS), Directorate for Engineering (ENG), on May 26, 2009. Dr. Trew came to NSF from North Carolina State University. He received his Ph.D. degree in Electrical Engineering from the University of Michigan.

Ms. Claudia Postell joined NSF as Director, Office of Equal Opportunity Programs (OEOP), on August 3, 2009. Ms. Postell came to NSF from the Department of Veterans Affairs Medical Center. She received a J.D. degree from the District of Columbia School of Law.

b. NSF Staff Departures

Dr. Tony Chan, Assistant Director, Directorate for Mathematical and Physical Sciences (MPS) will leave NSF on September 1, 2009 to become President of the Hong Kong University of Science and Technology. Dr. Bement stated that during the past 3 years, Dr. Chan provided outstanding leadership with an insightful and balanced approach to managing the complex and diverse portfolio of MPS activities. In addition to his intellectual contributions, Dr. Bement noted that NSF will miss his sense of humor and good nature, and that all of NSF enjoyed working with him.

Dr. David Lightfoot, Assistant Director, Directorate for Social, Behavioral, and Economic Sciences (SBE) will also leave NSF. Dr. Bement stated that since May 2005, Dr. Lightfoot emphasized the role of SBE scientists in addressing key questions at the intersection of climate, energy, and environmental research. Within SBE, he encouraged active consideration of the role of infrastructure, particularly cyberinfrastructure, in advancing SBE science. Dr. Bement announced that Dr. Myron Gutmann from the University of Michigan will replace Dr. Lightfoot and join NSF as a Consultant on August 10, 2009 and as SBE Assistant Director on November 2, 2009.

c. Congressional Update

Congressional Highlights

The House recently passed its version of the Commerce, Justice, Science and Related Agencies Appropriations for FY 2010, which provides funding for NSF. The Senate Appropriations Committee passed its version of the Senate Commerce, Justice, Science and Related Agencies Appropriations bill, and was awaiting action on the Senate Floor. Both bills will keep the NSF budget on the doubling path set by the President. The House provided NSF's overall funding at \$6.936 billion, an increase of \$446 million, or 6.9 percent, over the FY 2009 Omnibus. The Senate provided NSF with \$6.916 billion, an increase of \$425 million, or 6.6 percent, over the FY 2009 Omnibus.

Hearings

On June 16, 2009, the House Science and Technology Subcommittees on Technology and Innovation and on Research and Science Education held a joint hearing on Agency Responses to Cyberspace Policy Review. Dr. Jeannette Wing, Assistant Director, Directorate for Computer and Information Science and Engineering (CISE), testified for NSF.

On July 30, 2009, the House Science and Technology Subcommittee on Research and Science Education held a hearing on “A Systems Approach to Improving K-12 STEM Education.” Dr. Wanda Ward, Acting Assistant Director, Directorate for Education and Human Resources (EHR), testified for NSF.

Other Activities

On July 9, 2009, NSF notified Members of Congress and Governors that President Obama named more than 100 young science, math, and engineering teachers and mentors as recipients of two prestigious Presidential Awards for Excellence. Also announced were 100 beginning researchers as recipients of the Presidential Early Career Awards for Scientists and Engineers Awards. These awards will be presented at a White House ceremony in the fall.

AGENDA ITEM 10: Open Committee Reports

a. Executive Committee (EC)

The Executive Committee was cancelled and did not meet as scheduled.

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

Dr. Dan Arvizu, A&O chairman, reported on information from the Office of Information and Resources Management (OIRM) on the future NSF headquarters. OIRM notified NSF that the current leases on NSF’s headquarters facilities in the Ballston area of Arlington expire in December of 2013. A new long-term lease, subject to congressional authority, and a competitive new lease action will be pursued by Government Services Administration (GSA) during the upcoming fiscal year.

To ensure that NSF’s interests are incorporated from the beginning stages of the project, the Division of Administrative Services (DAS) of OIRM has been actively engaged in establishing the agency’s role and requirements over the last 10 months. The goal is to have the most appropriate acquisition strategy to meet NSF’s needs in a very complex environment. OIRM will provide a more detailed report at the December 2009 meeting.

Another pending topic was support of research with international implications. Dr. Arvizu stated that globalization of research and education requires that issues related to accountability and the responsible conduct of research be addressed from an international perspective. The Organization for Economic Cooperation and Development (OECD) Global Science Forum Coordinating Committee for Facilitating International Research Misconduct Investigations issued a report in spring 2009. Also, the NSF Office of International Science and Engineering (OISE) was working on a white paper, which it will discuss with the Office of Inspector General (OIG). OISE will provide more information to the Board in December 2009.

Dr. Arvizu reported that the Dr. Bement and Dr. Cora Marrett, NSF Deputy Director, provided a briefing on human resource management at NSF. Recent Senate Appropriations Committee language raised concerns about both human resource management and grants management. This appropriation was not yet passed, but NSF had efforts underway to address these concerns. Dr. Bement reviewed for the Board the communications NSF had with Congress. He reaffirmed NSF's commitment to management excellence, and stated that NSF intends not only to address the concerns that were raised, but to achieve NSF's goal to be recognized as the model for workforce management in the Federal Government. Dr. Marrett identified specific actions that were completed, are underway, or are planned. She characterized the actions as being in two general areas: heightened expectations for managerial excellence, and improved communications. Dr. Marrett asked that the Board help ensure that workforce management at NSF is, "the masterpiece that our dedicated staff deserves." The Board will discuss the topic further at the September 2009 retreat.

Mr. Thomas Cooley, NSF Chief Financial Officer, discussed the Senate language on grant management, what NSF already had in place, and future plans to address grants management metrics in a robust, holistic fashion, with a risk-based approach. The undertaking these activities will require additional resources. It is also important to address the question of cost-effectiveness and what value is being added when adding additional data and reporting requirements. Mr. Cooley also discussed the current and prior year financial statement audits, NSF's internal control activities, and plans for investing in a new financial and property system to replace a strained and aging system. He concluded his report with an update on NSF's implementation of the American Recovery and Reinvestment Act (ARRA). The added volume of work and new grantee requirements had a significant impact on operations and required additional internal control activities in addition to the added burden to grantees.

Ms. Allison Lerner, NSF Inspector General, presented details about the OIG ARRA activities. OIG's early stage projects focused on preventing problems before they occur. Toward that end, the OIG staff were attending agency planning meetings and offering comments on key documents. They issued an analysis of what they consider to be significant risks associated with the stimulus money, and a report on what key stakeholders expect of NSF in its use of those funds. More OIG projects were in progress or about to begin, and a more detailed briefing was planned for the December 2009 meeting. Ms. Lerner also commented on NSF's efforts to address the open items of the Management letter from last year's audit report.

c. Committee on Education and Human Resources (CEH)

Dr. John Bruer, CEH chairman, reported that Dr. Camilla Benbow provided CEH with an update for the "Expert Panel Discussion on the Next Generation of STEM Innovators" to be held at NSF on August 24-25, 2009. Dr. Bruer noted interest in this activity from the expert community as well as policymakers. The Secretary of Education, Mr. Arne Duncan, and Mr. Dean Kamen, inventor/entrepreneur, accepted invitations to participate in this event. Secretary Duncan will provide the keynote address on August 25.

The committee discussed STEM education grand challenges, a topic raised at the May CEH meeting. Dr. Bruer informed the committee that he and Drs. Benbow and Sullivan were holding informal discussions during the week with NSF assistant directors and office directors to become

more familiar with the broad spectrum of STEM education activities underway at NSF and to better understand how the directorates and offices work together. Some key observations that emerged from these discussions include the NSF support of a vast and robust spectrum of STEM education initiatives, usually reflecting the goal to integrate research and education. The bulk of the initiatives focus on STEM educational activities and projects across the developmental spectrum including graduate fellowships, pre- and in-service teacher training, broadening participation in the sciences and engineering, classroom curricula and modules, museum exhibits, and science camps, to name a few. Other efforts at NSF focus on educational research, which is intended to produce general knowledge that can be scaled up for applications in broader context. Dr. Bruer indicated that there is clear evidence of a strong and concerted endeavor by the NSF's research and related activities (R&RA) directorates and offices to collaborate with the EHR, and examples include joint retreats, EHR staff participating in working groups to design new solicitations for R&RA progress, and EHR serving on site visits to NSF centers. Dr. Bruer stated that this was a positive move, which is reflected in a broader stream of interest seen in the research community as a whole, that points to researchers becoming increasingly interested in and concerned about educational research and how that could improve both their educational outreach activities and their own teaching and instruction.

Dr. Bruer reported that Dr. Sullivan initiated a discussion in CEH to explore the idea of a possible decadal survey of STEM education and activities by outlining what such an activity might entail, its benefits, and its challenges. Dr. Sullivan indicated that decadal studies, which are used by a number of disciplines, address such issues as the current state of the frontiers of the science, intellectual questions for the field, technology needs and limitations, and the current and projected state of the workforce. She noted that such surveys result in valuable insights and information from the community that can result in improved collective understanding of the subject's discipline and the overall landscape. Although scientific and technology drivers may be different for educational research, understanding that landscape could help provide a cohesive framework for addressing STEM education's grand challenges. Committee members underscored the importance of strategic planning. Broadly defined definitions and terms are required, and both top down and bottom-up approaches should be utilized in developing a strategic roadmap together with careful conversations with the interested community. The committee regards this decadal survey project as preliminary, and anticipates that the focus over the upcoming year will be on enhancing the committee's knowledge and considering possible strategic approaches to such a survey.

Finally, Dr. Bruer reported that Dr. Marrett informed CEH about a new initiative, the NSF Task Force on Innovation and Learning, and its anticipated activities. She noted that the task force was being formed, and that it will be a 12-month activity led by Dr. Wing. The task force will examine STEM education both from the learning side as well as from the innovation side, such as what are the best practices, sharing perspectives across agencies, and where does NSF fit within the context of STEM education within the Government. The task force will look at current NSF activities, and consider what future investments the agency should make. Dr. Marrett noted that the interest of the committee, especially as it considers the prospect of the decadal survey, will complement the task force work.

d. Committee on Science and Engineering Indicators (SEI)

Dr. Louis Lanzerotti, SEI chairman, reported that Mr. Rolf Lehming, Program Director, SBE Division of Science Resources Statistics, summarized the Federal agency responses to the Orange Book draft of *Science and Engineering Indicators 2010*. He reported that seven agencies sent reviews, mostly recommending technical and editorial changes that could be readily incorporated for the current volume. He outlined proposed responses to several substantive comments and suggested that several proposed analytic issues be tabled for the present and considered in planning the 2012 report. Mr. Lehming commented that he expected to receive comments from OSTP, the Office of Management and Budget (OMB), and the Department of the Treasury.

Dr. Lanzerotti thanked Drs. John Bruer, Patricia Galloway, Alan Leshner, and Douglas Randall for their written comments on the Orange Book, mostly on Chapter 7 (Science and Technology: Public Attitudes and Understanding). The Chapter 7 draft was revised in response to Board concerns raised at the May 2009 meeting, and the committee needed to consider forthcoming and newly received responses to the revised draft from additional Board Members. Discussions with Drs. Bruer and Galloway, who made the most extensive comments on the chapter, indicated that the overall plans for additional revisions should resolve their concerns. Also, some committee members still intended to submit Orange Book comments. To keep on schedule and to enable changes to be incorporated, Dr. Lanzerotti stated that further comments on the Orange Book were needed within the next few days. The committee agreed that, with the exception of Chapter 7, which will undergo additional minor revisions, the Orange Book was ready to move forward and recommended approval by the Board.

The Board unanimously APPROVED the Orange Book draft for *Science and Engineering Indicators 2010*, except for Chapter 7, subject to final edits approved by the Chairman of the Board and the SEI chairman.

Dr. Lanzerotti extended his thanks to Board Members and Board Office staff for their continued participation with this project. He indicated that the process was on schedule for delivery by mid-January 2010.

A draft of the *Indicators* Overview chapter will be sent for Board review in early September 2009. The Overview chapter is a synthesis of information within *Indicators*. Mr. Lehming, who is the principal drafter of the chapter, described the themes of the Overview, which will highlight the globalization of science and engineering (S&E) research and related economic activity. It will compare the U.S., European Union, Japan, China, and other emerging Asian countries, and describe how the U.S. is continuing to play the leading national role in world S&E, although it is no longer in a position of unquestioned dominance. The Overview chapter will complement the planned Companion Piece on “Globalization of Science and Engineering Research.”

The committee discussed the drafts of the six Digest “stories” (Board Book page 155), including the newly developed story on globalization, which are proposed to comprise the 2010 *Indicators* Digest. Dr. Lanzerotti thanked Drs. Arden Bement, G. Wayne Clough, Esin Gulari, and Alan Leshner for serving on the *ad hoc* working group to review the story drafts. In view of the committee’s responses to the proposed content, print layout, and Web prototype of the Digest, the committee recommended approval by the Board.

The Board unanimously APPROVED the *Digest of Key Science and Engineering Indicators 2010* “stories,” subject to final edits approved by the Board Chairman and the SEI chairman.

Finally, a draft of the Companion Piece, “Globalization of Science and Engineering Research,” was being developed. Dr. Lanzerotti will be working with the Board’s “Companion Piece Development Group,” which includes Drs. Ray Bowen, Pat Galloway, José-Marie Griffiths, Jon Strauss, and Mr. Arthur Reilly and Board Office staff, to develop a discussion draft that will be ready for committee review in mid-October 2009. Dr. Lanzerotti thanked Ms. Jean Pomeroy, Board Office Senior Policy Analyst, for a detailed timeline for this project.

e. Committee on Programs and Plans (CPP)

Dr. Kelvin Droegemeier, CPP chairman, reported on the following three information items.

For the information item on the National Ecological Observatory Network (NEON), Dr. James Collins, Assistant Director, Directorate for Biological Sciences (BIO), summarized the biological sciences at NSF, outlines NEON-enabled science, and gave a status report on NEON’s MREFC process. BIO expects to bring two action items relating to NEON before the Board in early 2010. Dr. Thomas Taylor inquired about the nature and extent of NEON partnerships and collaboration. Dr. Collins and Dr. Elizabeth Blood, NEON Program Director, explained that there were substantive partnership activities, especially with other Federal agencies on issues such as standardized procedures and data protocols. Dr. France Córdova inquired about management controls and evaluation points for NEON to ensure that the project remains focused, and Dr. Collins responded that NSF will prioritize proper stewardship elements of the project to remain focused. Dr. Randall inquired about adoption management and the implementation of NEON recommendations included in a National Research Council (NRC) report. Dr. Collins responded that those report recommendations were being addressed in the NEON process.

For the information item on NSF Data Policy Discussion, Dr. Edward Seidel, Director, Office of Cyberinfrastructure (OCI), summarized NSF’s work on data policies and activities in data sharing and access. Dr. Barish inquired about NSF’s position on international collaborations, noting the difficulties with intellectual property rights that cross international boundaries, and asked if NSF looked at other models for open access of data. Dr. Seidel responded that NSF was looking at these issues in great depth regarding international collaboration and data access models. Dr. Bowen noted that there are varying opinions on the Board about open access and inquired about NSF’s position. Mr. Lawrence Rudolph, General Council, responded that “data sharing” and “open access” are different issues to consider and that there is no obvious resolution to these issues.

For the information item on Management and Operation of the Gemini Observatory, Dr. Chan and Dr. Craig Foltz, Acting Division Director, MPS Division of Astronomical Sciences, presented an update on the management and operation of the Gemini Observatory, which consists of a set of twin eight-meter optical/infrared telescopes. Gemini South is in Chile, and Gemini North is in Hawaii. Together these telescopes have access to the entire sky. The Association of Universities for Research in Astronomy (AURA) is the managing entity for Gemini Management and Operations. The current cooperative agreement with AURA expires in December 2010. It was determined by the Gemini Board that the cooperative agreement should

be extended rather than competed at this point due to ongoing discussions among international partners. MPS expects to bring an action item to extend the current cooperative agreement before the Board at the May 2010 meeting.

CPP Subcommittee on Polar Issues (SOPI), Dr. Strauss, chairman

Dr. Karl Erb, Director, Office of Polar Programs (OPP), reported that a panel of experts will be meeting to review safety procedures in place at Summit Station, Greenland, in light of the recent accident there. Also, there will be a review next year of the Antarctic Program logistics and infrastructure. Dr. Erb discussed a joint Greenland-US-Denmark science education event that was recently held in Greenland, and provided an update on the IceCube construction project with its DeepCore array. Despite the weather and the economy, 19 strings were installed rather than the 14-16 strings originally planned. Design modifications for six of the strings will result in a higher density of optical modules, leading to an increased energy range for the detector.

Dr. Erica Key, OPP Associate Program Manager, provided an overview of current Arctic modeling progress, including advancements using the Community Climate System Model (CCSM). It was shown that improvements to climate simulations require integration of many model components, including biological and human influences, as well as ice sheets and black carbon aerosols. These improvements are needed not only for increasing model accuracy, but also for addressing the needs of stakeholders. Because climate models cannot resolve some of the physical and biological features that are of interest to stakeholders, emerging regional models are being developed to fill this gap. Regional models are being used to model the Bering Sea, including models for the atmosphere, ocean, ecosystem, and human impacts.

Lieutenant Colonel Mark Doll, USAF, reported on the impact of a proposed ban of heavy grade oils in the Antarctic on the U.S. Antarctic Program (USAP). This ban, if adopted, would become effective in July 2011, and could lead to higher operating costs for two of the ships supporting USAP. Lieutenant Colonel Doll outlined a number of issues posed by the proposed ban, including the availability of ships that could meet the requirements and the availability of lower-density fuels along the resupply route. He noted that one possible option to mitigate this would be for the ships' operator, Military Sealift Command, to claim sovereign immunity.

CPP Task Force on Sustainable Energy (SE), Drs. Arvizu and Strauss, co-chairmen

Although SE did not hold a meeting in August 2009, Dr. Arvizu, SE co-chairman, gave a brief status report to CPP. He explained that the report, *Building a Sustainable Energy Future: U.S. Actions for an Effective Energy Economy Transformation (NSB-09-55)*, was approved at the May 2009 Board meeting, and copies of the report were printed for distribution. The report will be distributed to stakeholders including members of Congress, Hill staff, the White House, roundtable participants, NSF employees, and broader representatives in academia, government, professional societies, and non-profit organizations. OLPA plans to issue a press release about the report. Dr. Arvizu summarized recent outreach activities and noted plans to continue outreach activities with the support of the Board Office and NSF. He thanked task force members for their work, and he also thanked numerous contributors and aides for their efforts and support throughout the process for producing the report.

f. Committee on Strategy and Budget (CSB)

Mr. Arthur Reilly, CSB chairman, reported that the committee heard an update on the FY 2010 request. Dr. Bement briefly reviewed the FY 2010 congressional marks by account and identified differences between the House and Senate versions. The Agency Operations and Award Management (AOAM) account was highlighted as an area of grave concern, as both the House and Senate reduced that account by 6 percent below the FY 2010 request. CSB will work with the Board Office to write a letter of support for full funding of the AOAM request.

Dr. Marrett and Mr. Cooley presented a status update on FY 2009 and ARRA funding. They highlighted major milestones related to both FY 2009 and ARRA appropriations, identifying obligations and commitments to date and those expected by September 30, 2009. Currently, NSF obligated \$5.4 billion of the \$9.5 billion appropriated in FY 2009. NSF anticipates approximately \$600 million in ARRA carryover, primarily in the areas of Major Research Instrumentation, Academic Research Infrastructure, and MREFC funding. The week prior to the Board meeting, NSF processed 1,300 award actions, which was the largest number of award actions processed in a 1-week period in NSF's history. Additionally, Mr. Cooley reported that with ARRA funds, NSF exceeded the target goal of 4,000 awards and expected to reach the target goal of 2,400 new investigators. Although great progress was made in committing and obligating 2009 and ARRA funds, staff resources may be a limiting factor in processing all of the FY 2009 actions prior to the close of the fiscal year. As a result, there may be additional FY 2009 carryover funds in addition to the \$600 million of planned ARRA carryover funds. The committee noted NSF's extraordinary achievements in managing and processing the large volume of actions associated with this unprecedented funding.

Mr. Reilly thanked Mr. Darren Dutterer and Ms. Holly Smith, CSB Executive Secretaries, for all their assistance, and all the NSF management and staff responsible for providing the committee with materials essential for its work.

CSB Subcommittee on Facilities (SCF) – Dr. José-Marie Griffiths, chairman

Although the SCF did not meet, Mr. Reilly provided an update on the subcommittee on behalf of Dr. Griffiths. The subcommittee held a teleconference discussion on existing background documents and a draft template for collecting information from the directorates. SCF will meet by teleconference in late summer or early fall to reach agreement on what materials it will need to conduct a thorough review of the entire NSF portfolio of large facilities, with a goal to begin reviewing this information starting at the February 2010 Board meeting. SCF will finalize its assessment of the research infrastructure portfolio at the May 2010 Board meeting to inform ongoing CSB budget and strategic planning discussions.

g. Task Force on the NSB 60th Anniversary (60ANN)

Dr. Patricia Galloway, 60ANN chairman, reported that the NSF 60th Anniversary Working Group formed by Dr. Marrett submitted a proposal for a AAAS panel discussion at its annual meeting. The title of the panel is, "The Future of NSF on its 60th Anniversary." The annual meeting will be held in San Diego, February 18-22, 2010, which is 2 weeks after the Board meeting slated for February 3-4. Dr. Galloway announced that AAAS accepted the proposal

and that all the invited speakers were interested in participating. The panel will consist of current and past NSF Directors: Dr. Arden Bement, Mr. Erich Bloch, Drs. Rita Colwell, Neal Lane, and Walter Massey. Dr. Beering will participate as a Discussant, and Dr. Galloway will serve as Moderator of this distinguished panel. The AAAS meeting will be an ideal setting with a large audience for discussion of NSF's global leadership and future challenges. The event will also provide high visibility for NSF and the 60th Anniversary landmark.

Because the AAAS proposal was accepted and in light of budget restrictions, earlier plan to hold a symposium of NSF researchers was curtailed. However, the NSF working group's efforts to identify "Voices from the Future" for the symposium produced a list of 39 impressive individuals. Drs. Marrett and Galloway are interested in exploring the possibility of asking several of these individuals to speak at NSB meetings and NSF venues in 2010. A short list of individuals will be compiled for consideration at an upcoming teleconference.

Under Dr. Marrett's leadership, the NSF working group is also exploring other activities for the 60th Anniversary commemoration, and focusing on those activities that are low budget, but high impact. The working group will make their recommendations to Dr. Marrett later in August 2009 and then move forward with specific approved projects, which will be discussed in a planned task force teleconference in September 2009.

During the 60ANN meeting, Dr. Sullivan suggested that social networking media be considered as a means of engaging with the public to include Twitter and Facebook. These and other mechanisms will be explored further to determine the best public outreach.

OLPA will also work on plans to commemorate the 60th Anniversary. Specifically, they are helping with: compilation of the "Sensational 60" great ideas/achievements over the past 60 years, compilation of a list of significant NSB Highlights in the past 10 years, asking Congress to pass a joint resolution honoring NSB and NSF; developing a letter to be co-signed by congressional supporters and entered into the *Congressional Record*, and OLPA will obtain official copies of the *Congressional Record* and have them framed for each NSB member; obtaining a letter or executive proclamation from President Obama and/or a letter from OSTP congratulating NSB and NSF for 60 years of discovery and achievement; having a flag flown over the Capitol to commemorate the 60th Anniversary and frame it for the Board Office; and looking into the possibility of hosting a reception on Capitol Hill. Dr. Marc Rothenberg, NSF Historian, described his process for identifying candidates for the "Sensational 60" and the NSB highlights. Additionally, OLPA will be arranging for press releases and other media coverage of the 60th Anniversary events and activities throughout 2010.

Dr. Galloway thanked the NSF 60th Anniversary Working Group, especially Dr. Marrett and co-chairmen, Mr. John Tsapogas and Ms. Tracy Gorman, for all their efforts as well as Ms. Ann Ferrante, Board Office, for serving as the NSB liaison for this work.

Dr. Beering adjourned the Open Session at 2:10 p.m.

[signed]
Ann A. Ferrante
Executive Secretary
National Science Board

Attachment:

Appendix: NSB-09-42, NSB Calendar of Meetings, 2010

NATIONAL SCIENCE BOARD
CALENDAR OF MEETINGS

2010

February 3 - 4
(Wednesday – Thursday)

May 4 -5
(Tuesday – Wednesday)
[Annual Meeting and Awards Dinner]

August 25 - 26
(Wednesday - Thursday)

September 23 - 24
(Thursday - Friday)
[Annual Retreat and Visit]

December 1 - 2
(Wednesday - Thursday)