

MEMORANDUM TO MEMBERS OF THE NATIONAL SCIENCE BOARD

SUBJECT: Summary Report of the August 6-8, 2007 Meeting

The major actions of the National Science Board (Board) at its 399th meeting on August 6-8, 2007 and a preliminary summary of the proceedings are provided. This memorandum will be publicly available for interested parties to review. A more comprehensive set of Board meeting minutes will be posted on the Board's public Web site (<http://www.nsf.gov/nsb/>) following Board approval at the October 2007 meeting.

1. Major Actions of the Board (not in priority order):

- a. The Board approved the minutes of the Plenary Open Session (NSB-07-59) for the May 2007 meeting (<http://www.nsf.gov/nsb/meetings/2007/0514/minutes.pdf>). Minutes for the Plenary Executive Closed and Closed Sessions for the May 2007 meeting of the Board were also approved.
- b. The Board approved a resolution to close portions of the upcoming October 2-3, 2007 Board meeting dealing with staff appointments; future budgets; grants and contracts; specific Office of the Inspector General investigations and enforcement actions; and National Science Foundation (NSF) participation in a civil or administrative action, proceeding, or arbitration (<http://www.nsf.gov/nsb/meetings/2007/1002/close.pdf>).
- c. The Board authorized the Deputy Director, at her discretion, to make an award for support of High-Performance Computing (HPC): *Leadership-Class System Acquisition - Creating a Petascale Computing Environment for Science and Engineering*, University of Illinois at Urbana-Champaign.
- d. The Board authorized the Director, at his discretion, to make an award for support of HPC: *Joint Institute for Computational Sciences Response to NSF-05-625*, University of Tennessee at Knoxville.
- e. The Board authorized the Director, at his discretion, to make an award for the project, High-Performance Computing Operations (HPCOPS): *Empowering the TeraGrid Science and Engineering Communities*, National Center for Supercomputing Applications, University of Illinois at Urbana-Champaign.
- f. The Board authorized the Director, at his discretion, to make an award for the project, HPCOPS: *Expanding TACC HPC Capacity and User-Support Services in the NSF TeraGrid*, Texas Advanced Computing Center, University of Texas at Austin.

- g. The Board authorized the Director, at his discretion, to make an award for the proposal, HPCOPS: *High Performance Computing Operations in Support of Science and Engineering Research and Education*, San Diego Supercomputing Center, University of California at San Diego.
- h. The Board authorized the Deputy Director, at her discretion, to make an award for support of the National High Magnetic Field Laboratory, Florida State University.
- i. The Board authorized the Director, at his discretion, to include the construction of the Advanced Technology Solar Telescope in a future budget request.
- j. The Board approved the FY 2009 budget requests to the Office of Management and Budget for the NSF Office of the Inspector General, the National Science Board, and the National Science Foundation.
- k. The Chairman of the Board announced that, based on the recommendation of the Board at the Plenary Executive Closed Session, he has selected Fairbanks, Alaska as the site of the annual Board retreat, visit, and off-site meeting on February 6-7, 2008.
- l. The Board approved the “Orange Book” draft for *Science and Engineering Indicators 2008*,” subject to final edits approved by the Chairman of the Board and the chairman of the Subcommittee on Science and Engineering Indicators.
- m. The Board approved the draft *National Action Plan for Addressing the Critical Needs of the U.S. Science, Technology, Engineering, and Mathematics Education System (NSB/EHR-07-9)* to be released for public comment and review, subject to minor edits approved by the Chairman of the Board and the chairman of the Committee on Education and Human Resources.
- n. The Board approved a change in the NSF Merit Review Criteria I to specifically include review of the extent to which a proposal also suggests and explores potentially transformative concepts.
- o. The Board approved forwarding a list of potential Board Member nominees to the President for the Board Class of 2008-2014.

2. Board Chairman’s Report

Dr. Steven Beering, Board Chairman, reminded both the Executive Committee and the chairman of the Committee on Programs and Plans (CPP) that under NSF Authorization Act of 2002, Section 14 requires that the Board report to Congress any delegations of authority related to the use of Major Research Equipment and Facilities Construction (MREFC) account. Dr. Beering will be reporting to Congress that there has been no delegation of authority related to MREFC during the last year. That report is due September 15, 2007.

Dr. Beering reported that since the last Board meeting, a representative contingent of Board Members visited the state of Hawaii, June 3-9, 2007 and met with leaders from the University of Hawaii, including the President, Vice Presidents and Chancellors of several campuses, as well

as, the Governor's office, Hawaii state legislators, science and technology industry leaders, and representatives from local Hawaiian organizations engaged in broadening participation in STEM fields. The visitation team had discussions and informal meetings with over 100 people on 3 islands over 5 days. In addition to Dr. Beering, Board visitation team consisted of Drs. Dan Arvizu, Ray Bowen, Kelvin Droegemeier, Karl Hess, Elizabeth Hoffman, and Kathryn Sullivan.

Many of the briefings and discussions highlighted the enormous value in weaving Native Hawaiian and broader Pacific Islander culture and perspectives into science research and education in Hawaii. Much can also be learned from the Hawaiian model for pro-actively broadening participation of under-represented minorities in fields of science, technology, engineering, and mathematics. With this knowledge of experiences and model initiatives, the Board hopes to be better positioned to address national policy issues related to science and engineering research and education, as well as improving our guidance and policies for the NSF as it continues to enhance its critical support of such effort in Hawaii and throughout our Nation.

A list of candidate sites for the 2008 Board retreat, meeting, and visit was presented and discussed at the Plenary Executive Closed meeting. The list was prepared by the Board Office with input from various Board Members. The Board reached a consensus recommendation to the Chairman of the Board that the retreat, meeting, and visit site for February 2008 should take place at Fairbanks, Alaska. Dr. Beering announced that he accepted this recommendation. Dr. Michael Crosby, Executive Officer and Board Office Director, will be developing the logistics and draft agenda and provide updates to the Board at future meetings. (See: 1.k.)

Dr. Beering announced that Dr. Kenneth Ford had been appointed to serve on NASA's Advisory Council. Dr. Ford joined 33 other widely recognized scientists and space experts as NASA advisors on key issues and policies important to the space agency's missions, exploration, and leadership.

Dr. Sullivan, Board Vice Chairman, announced that Dr. Beering received the Institute of Industrial Engineers (IIE) Honorary Award in May 2007. This is the highest honor that IIE may grant an individual of acknowledged professional eminence who is not a member of the institute. Dr. Beering was acknowledged for a distinguished academic career that includes 10 years as Dean of Medicine at Indiana University and 18 years as President of Purdue University.

Dr. Sullivan reported for the *ad hoc* Task Group on NSB Meeting Design, which is reviewing Board meeting cycles, milestones, and schedules. Dr. Sullivan met with Drs. Patricia Galloway, José-Marie Griffiths, and Douglas Randall for an initial review, the first in a decade, of factors that shape dates and structure of Board meetings and a retreat during a year. The *ad hoc* task group intends to work with the Board Office and appropriate NSF staff to develop a draft of alternative timeframes.

3. NSF Director's Report

Dr. Arden Bement, NSF Director, introduced the following new NSF staff member: Dr. Henry Blount, Head, Office of Experimental Programs to Stimulate Competitive Research (EPSCoR) (as of May 27, 2007).

For the congressional update, Dr. Bement reported that culminating a 2-year effort, Congress cleared the America COMPETES Act on August 2, 2007. The bill includes provisions affecting NSF, National Institutes of Standards and Technology (NIST), Department of Energy (DOE), National Aeronautics and Space Administration (NASA), National Oceanic and Atmospheric Administration (NOAA), Department of Education, and the White House Office of Science and Technology (OSTP).

On July 26, 2007, the House of Representatives passed the FY 2008 Commerce, Justice, Science (CJS) Appropriations bill H.R. 3093. The Administration reacted to the House passage of the bill by issuing a Statement of Administration Policy (SAP) indicating its intent to veto the bill. On June 28, 2007, the Senate Committee on Appropriations passed the Commerce Justice Science and Related Agencies FY 2008 funding legislation, S. 1745.

4. Board Committee Reports

a. Executive Committee (EC)

Dr. Bement, EC chairman, reported on two information items: an award to the International Institute of Applied Systems Analysis (IIASA) and another award to the Human Frontiers Science Program (HFSP) involving both NSF and the National Institutes of Health (NIH). Both awards were directed by the Office of Science and Technology Policy, based on U.S. national interests and the importance of science. Dr. Beering notified the committee about the Board's congressional requirement of the NSF Authorization Act of 2002, Section 14 report, and that no delegation of MREFC authority was made by the Board during the past year.

b. Audit and Oversight (A&O) Committee

A&O Open Session

Dr. Arvizu, A&O chairman, reported on an informal meeting that was held with NSF and the Office of the Inspector General (OIG) staff to provide an update on some of the specific issues related to the Raytheon audit corrective action plan. The majority of questioned direct costs and issues related to the categorization of certain indirect costs are expected to be resolved by September 30, 2007. New issue resolution target dates and additional actions will be reflected in an updated corrective action plan to be prepared later in August 2007.

The committee held a closed meeting by teleconference on July 30, 2007 to discuss an OIG report on Board operations, policies, and procedures. The report had been requested by the Board Chairman. As an outcome of that meeting, Dr. Arvizu directed Dr. Hoffman to prepare a draft statement for A&O to consider regarding the representation of the Board by its Chairman. Dr. Hoffman agreed to continue to lead the refinement of a proposed statement and to provide the new version of the statement at the October 2007 A&O meeting for committee endorsement and recommendation to the full Board for approval.

Another outcome of the July 30, 2007 teleconference was the desire expressed by A&O to further review and clarify the manner in which the Board receives its legal advice. One issue is whether there is a need for the procurement of independent legal advice in cases where the

interests or position of the Board may differ from the NSF Director. Mr. Lawrence Rudolph, NSF General Counsel, gave a presentation on how the Board currently receives legal advice, and in particular, how OGC is able to serve both NSF management and the Board in situations where their interests may diverge. Dr. Arvizu asked Drs. Bowen and Galloway to lead a small group, including Drs. Camilla Benbow, Kathryn Sullivan, and Richard Thompson, to develop a position for the committee to consider on this matter, which will be further discussed at the October 2007 meeting.

Mr. Salvatore Ercolano, Partner-in-Charge with Clifton Gunderson LLP, briefed the committee on the status of the NSF financial statement audit and IT security program review. Mr. Ercolano reported that the audit is on-track. With regard to the two reportable conditions, the auditors are evaluating NSF's new procedures for monitoring grants. Progress on contract monitoring is likely to be counted as either a significant deficiency or material weakness. Moreover, inconsistencies in the oversight of contracts have caused the auditors to expand the scope of work over NSF's property accounts. Meanwhile, the review of NSF's IT security program indicates that, in general, security has improved from last year.

Mr. Thomas Cooley, NSF Chief Financial Officer, concurred with Mr. Ercolano's description of the audit status, and outlined plans for Total Business System Reviews in 2007 and 2008 for large facilities. He also reported that NSF's Advisory Committee for GPRA Performance Assessment concluded that NSF had demonstrated "significant achievement" for the three strategic outcome goals in the new strategic plan: Discovery, Learning, and Research Infrastructure.

A&O Closed Session

The committee reviewed the OIG's FY 2009 budget submission, and approved recommending it to the full Board (NSB-07-86). [*The full Board subsequently approved the OIG budget submission.*] (See: 1.j.) The committee also heard about issues related to several ongoing investigations.

c. Education and Human Resources (EHR) Committee

Dr. Jo Anne Vasquez gave a brief update on involvement of K-12 science, technology, engineering, and mathematics (STEM) faculty. She and Dr. Benbow will compile a proposal on this topic, and Dr. Benbow will make a presentation on preparing the next generation of STEM innovators at the October 2007 meeting.

The EHR committee agreed that it would be valuable to invite representatives from the University of Hawaii to brief the Board on several education issues of common interest that were raised during discussions with the Board visitation team to Hawaii that have relevance to CPP as well as EHR.

The EHR approved recommending the "Orange Book" draft for *Science and Engineering Indicators 2008* to the full Board, subject to final edits. [*The full Board subsequently approved the "Orange Book" draft of Indicators 2008, subject to final edits approved by the Board Chairman and the SEI chairman.*] (See: 1.1.)

The committee discussed the draft *National Action Plan for Addressing the Critical Needs of the U.S. Science, Technology, Engineering, and Mathematics Education System* (NSB/EHR-07-9). Dr. Vasquez reported on her experiences as she represented the Board at several education policy forums in the past few months. At these events she shared provisional recommendations considered by the Board as part of its action plan for STEM education. She noted for the committee that several legislative directives will look at STEM activities at the Federal level. Dr. Hoffman reviewed the background leading to the draft document, noting the input of more than 90 experts to the draft action plan either by serving on the Commission or one of its working groups or testifying before either the Board or the Commission. Dr. Crosby and Board Office staff have held roughly two dozen meetings with various stakeholders to gather input and support for the action plan. The committee agreed to send the draft forward to the full Board, recommending release for public comment, after incorporating the edits discussed, with the goal to finalize the draft at the October 2007 Board meeting. Additional written comments should be sent to Dr. Hoffman with copies to Dr. Elizabeth Strickland, Board Office staff, and Dr. Crosby. [The full Board subsequently approved release of this draft report for public comment and review, subject to minor edits approved by the Board Chairman and the EHR chairman.] (See: 1.m.)

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

SEI approved the recommendation to EHR that the Board approve the “Orange Book” draft for *Indicators 2008*, subject to final edits and data updates. Dr. Beering asked the lead reviewer for each chapter to review the final version of their chapters and provide him with their comments.

There was a consensus among Board Members attending the meeting that the cover selected by Dr. Louis Lanzerotti, SEI chairman, celebrating the 2007–2009 International Polar Year (IPY) with a montage of photographic images from the Arctic and Antarctic regions, was appropriate and an excellent choice for the *Indicators* volume.

Other matters covered at the meeting included: the structure of the Overview Chapter and the process for distributing it, and the ‘potential’ statistical appendix to SEI and the Board for review, discussion, and approval at the October 2007 meeting; and discussions on the condensed version of *Indicators*, the Companion Piece, and planning for *Indicators 2010*.

e. EHR *ad hoc* Task Group on Engineering Education

The *ad hoc* task group briefed the EHR Committee on the status of the draft report prepared as a result of the two Board workshops conducted. The *ad hoc* task group requested that EHR review the draft report and provide comments to Dr. Lanzerotti and the Board Office for discussion at the October 2007 meeting.

f. Committee on Programs and Plans (CPP)

CPP Open Session

The committee received brief updates from members regarding two recurrent discussion items: the Board policy on recompetition of NSF awards, and NSF facilities operations and management costs. The committee also considered revisions to the process of scheduling action items for Board review, and discussed a proposed change to the threshold for such action items. Finally, NSF presented the annual Major Research Facilities report, and the committee subsequently discussed its annual examination of priority order of MREFC new start projects.

CPP recommended that the Board approve NSF's proposed change to NSF Merit Review Criteria I to include review of the extent to which a proposal also suggests and explores transformative concepts. [*The Board subsequently approved a change to the NSF Merit Review Criteria I to specifically include review of the extent to which a proposal also suggests and explores potentially transformative concepts.*] (See: 1.n.) The committee also requested that NSF continue to develop their transformative research initiative strategy and provide an update on the progress of the developing plan at the meeting in October 2007.

The committee approved a revision to the document, Transmitting Director's Review Board Packages to the National Science Board (NSB/CPP-05-29) that includes the following: "No DRB action item will be brought to the Board without NSF having presented background information on such action item to the Board a maximum of 6 months prior."

Dr. Lanzerotti provided the committee with an update on the NSB Policy on Recompetition of NSF Awards discussion item, and Dr. Mark Abbott provided the committee with an update on the Facilities Management and Operations discussion item. Since March 2007, NSF has provided a large amount of data and information on these topics, and further discussions will be held in October 2007.

Mr. Cooley presented an NSF-proposed change to thresholds for which an action item must be brought to the Board for review and approval. The committee resolved to approve this proposal for this year and hold more extensive discussions in October 2007 before deciding on a permanent change to the policy.

Dr. Kathie Olsen, NSF Deputy Director, presented the annual report on NSF's Major Research Facilities, specifically reporting on the major science questions each facility will address as well as the cost and schedule status of each project entering the operations phase, in the construction phase, new starts, "possible new starts," and on the horizon. Dr. Olsen also identified five topics for further discussion with the Board: appropriate and timely prioritization of future projects; international partnerships; data sharing and interoperability; control of cost growth of MREFC projects; and integration of MREFC projects with Education and Outreach opportunities. The committee agreed to discuss these topics further in later meetings.

Finally, the committee discussed the annual Examination of Priority Order of MREFC New Starts. Board policy requires an examination of the priority order of MREFC new starts at least

once a year, but the committee judged it to be counterproductive to undertake a re-examination of this priority order at this time given the clear intent of Congress to approve funding for all new start projects.

CPP Closed Session

The committee considered the following seven action items, which were forwarded to the full Board for approval:

- High-Performance Computing (HPC): *Leadership-Class System Acquisition – Creating a Petascale Computing Environment for Science and Engineering*, University of Illinois at Urbana-Champaign ([NSB-07-79](#))
- HPC: *Joint Institute for Computational Sciences Response to NSF-05-625*, University of Tennessee at Knoxville ([NSB-07-80](#))
- HPC Operations (HPCOPS): *Empowering the TeraGrid Science and Engineering Communities*, National Center for Supercomputing Applications, University of Illinois at Urbana-Champaign ([NSB-07-83](#))
- HPCOPS: *Expanding TACC HPC Capacity and User-Support Services in the NSF TeraGrid*, Texas Advanced Computing Center, University of Texas at Austin ([NSB-07-84](#))
- HPCOPS: *High-Performance Computing Operations in Support of Science and Engineering Research and Education*, San Diego Supercomputer Center, University of California at San Diego ([NSB-07-82](#))
- Support for the National High Magnetic Field Laboratory (NHMFL) for FY 2008 – FY 2012, Florida State University ([NSB-07-78](#))
- Inclusion of the Construction of the Advanced Technology Solar Telescope (ATST) in a Future Budget ([NSB-07-77](#))
[The full Board subsequently approved the above resolutions.] (See: 1.c.-1.i.)

g. CPP Subcommittee on Polar Issues (SOPI)

Dr. Karl Erb, Director, Office of Polar Programs(OPP), reported on a recent formal ceremony at the Swedish Embassy in which an agreement was signed for the U.S. use of the *Oden*, both for icebreaking through the McMurdo channel on an annual basis and for joint U.S.-Sweden Arctic and Antarctic research expeditions.

Dr. Thomas Gaisser, Professor at the University of Delaware and leader of a team of researchers who are analyzing data from the IceCube detector array, provided an overview of preliminary results from the IceCube project. He discussed the current status of the construction effort, detector sensitivity and capabilities, comparison with earlier generation detectors, future plans, and the role of the international community in this collaborative effort.

Mr. Simon Stephenson and Dr. Scott Borg, OPP Division Directors, presented an update on the FY 2007 IPY competition. They briefly described proposals in the three emphasis areas (Understanding Change, Human/Biotic Systems, and Education), and discussed available funding.

h. CPP Task Force on International Science (INT)

Dr. Strauss, INT chairman, summarized his trip to the Middle East in July 2007 with Dr. Crosby to learn of regional experiences in international science and engineering partnerships. Meetings were held in Israel, Palestine, Egypt, and Jordan with more than 70 people during 8 days. Information from discussions in the Middle East will help shape recommendations in the current international draft report.

The task force reviewed and discussed 13 recommendations of the draft report, which were then approved with minor revisions. Board Members were asked to submit further revisions and edits in preparing a draft for public comment for approval at the October 2007 meeting.

i. CPP Task Force on Transformative Research (TR)

The task force heard a report from Dr. Bement regarding NSF's initial response to the Board's TR report, *Enhancing Support of Transformative Research at the National Science Foundation (NSB-07-32)*. Dr. Bement stated that NSF supported the guidelines set forth by the Board in its report, and that NSF is proceeding accordingly. NSF's developing plan for meeting the report's single recommendation to "develop a distinct, Foundation-wide Transformative Research Initiative," is three-pronged: (1) *Infuse* support of potentially transformative research (PTR) throughout NSF and all its programs, (2) *Learn* how to facilitate PTR, and (3) *Lead* the community through opportunities for PTR proposal submissions. The Office of the Director will provide the leadership team for integrating Foundation-wide input for further developing the Transformative Research Initiative. The task force will continue to review the developing NSF transformative research initiative strategy at the October 2007 meeting.

j. CPP *ad hoc* Task Group on Sustainable Energy

Drs. Jon Strauss and Dan Arvizu continue to develop the draft charge for the *ad hoc* Task Group on Sustainable Energy, and will report to the committee in October 2007.

k. Committee on Strategy and Budget (CSB)

CSB Open Session

Dr. Joanne Tornow, Chairman of the NSF Impact of Proposal and Award Management Mechanisms (IPAMM) Working Group, presented an overview of the group's report and summarized its major findings and recommendations. Dr. Tornow reported that the group examined statistical data drawn from NSF's databases and attitudinal data that were gathered through a large survey of individuals who had submitted proposals to NSF. The committee will discuss the IPAMM report at the October 2007 meeting and develop recommendations for Board guidance to NSF.

CSB Closed Session

Dr. Crosby presented the FY 2009 budget request for the Board, and CSB recommended that the Board approve the Board FY 2009 budget submission (NSB-07-87). [*The full Board subsequently approved the Board FY 2009 budget submission.*] (See: 1.j.)

Dr. Bement presented the NSF FY 2009 budget request, and the committee recommended that the Board approve the FY 2009 budget request (NSB-07-88). [*The full Board subsequently approved the NSF FY 2009 budget request.*] (See: 1.j.)

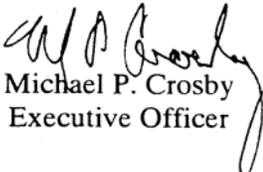
l. CSB *ad hoc* Task Group on Cost-Sharing

On the issue of cost-sharing, the *ad hoc* task group believes CSB will need to take action in the next few months to be responsive to congressional language directing the Board to evaluate and report to Congress on the impact of its policy to eliminate cost-sharing. CSB noted that A&O is also interested in this topic and welcomed its input at the October 2007 meeting.

m. *ad hoc* Committee on Nominations for NSB Class of 2008-20014 (NOMS)

Executive Closed Session

The *ad hoc* committee reviewed the slate of candidates during two teleconferences held in July 2007 and approved the minutes from those meetings. [*The full Board subsequently approved forwarding a list of potential Board Member nominees to the President.*] (See 1.o.)


Michael P. Crosby
Executive Officer