

**APPROVED MINUTES
PLENARY OPEN SESSION
468TH MEETING
NATIONAL SCIENCE BOARD**

National Science Foundation (NSF)
Via Videoconference
July 29-30, 2020

Members Present:

Ellen Ochoa, *NSB Chair*
Victor McCrary, *NSB Vice Chair*
Sudarsanam Babu
Roger Beachy
Arthur Bienenstock
Vicki Chandler*
Maureen Condic
Aaron Dominguez
Suresh Garimella
Dario Gil
Robert Groves*
Melvyn Huff
Steven Leath
W. Carl Lineberger
Emilio Moran
Julia Phillips
Daniel Reed
Geraldine Richmond
Anneila Sargent
Alan Stern
Stephen Willard
Heather Wilson
Maria Zuber

Members Absent:

W. Kent Fuchs

Sethuraman Panchanathan, *ex officio*

*- Consultant

There being a quorum, the National Science Board (NSB, Board) convened in Open Plenary Session at 11:00 a.m. on Wednesday, July 29, 2020, via videoconference with NSB Chair, Ellen Ochoa, presiding.

NSB Chair's Opening Remarks

NSB Chair Ochoa welcomed everyone to the NSB's 468th meeting. She began the meeting by welcoming newly confirmed NSF Director Sethuraman Panchanathan to his new position and thanking OSTP Director Kelvin Droegemeier for his stewardship of NSF while serving as the Acting Director since France Córdova's retirement in March 2020. She also thanked NSF Chief Operating Officer, Fleming Crim, for his dedicated service during the transition period.

New Member Swearing-in

Ochoa continued by performing a ceremonial swearing in for the Board's incoming class of new members in the class of 2020-2026. Those members include Suresh Babu from the University of Tennessee, Roger Beachy from Washington University, St Louis, Aaron Dominguez from Catholic University of America, Dario Gil from IBM, Melvyn Huff from the University of Massachusetts at Dartmouth, and Heather Wilson from the University of Texas at El Paso.

She then turned the floor to Director Panchanathan for his remarks.

NSF Director's Remarks

NSF Director Panchanathan began by thanking Kelvin Droegemeier for filling the Director's chair until the confirmation process was complete. He then spoke briefly about the numerous orientation meetings he has had with key stakeholders across the U.S. Government. He reported that he also had a number of meetings inside the Foundation with Directorate leaders and an all-hands Town Hall. On the international front, Panchanathan stated that he participated in a meeting of the Global Research Council, of which he is a member of the Governing Board.

Panchanathan then discussed the state of NSF during COVID-19. He lauded the Foundation's staff for continuing to fulfill the mission during difficult times. Compared to the same point in 2019, NSF has kept pace with award decisions and obligations of funds made. Panchanathan also reiterated the current policy on NSF's adherence to the guidance in OMB Memorandum M-20-26 that provided administrative relief to recipients of Federal financial assistance due to the impacts of COVID-19. He then highlighted some of the more than 800 RAPIDS grants NSF has awarded during the COVID period.

Panchanathan continued his remarks by providing an update on NSF's work on its Quantum Leap Big Idea. He announced that NSF, in partnership with the White House Office of Science and Technology Policy (OSTP), had committed \$75 million in funding for three new institutes in this area. The Quantum Leap Challenge Institutes for Enhanced Sensing, for Hybrid Quantum Architectures and Networks, and for Present and Future Quantum Computing will serve as the centerpiece for NSF's quantum work.

Panchanathan concluded his presentation by calling the Board's attention to the newly released Special Report on NSF INCLUDES. He stated that the report, entitled "Maintaining the NSF Commitment to Broadening Participation," lays out the progress that has been made to enhance diversity and inclusion in the S&E community.

Chair's Activity Report

NSB Chair Ochoa continued the meeting by providing a summary of her activities since the May meeting. She began by thanking the new slate of Committee Chairs for the 2020-2022 Board term. Those Chairs are Dan Reed for Committee on Awards and Facilities, Geri Richmond for the Committee on External Engagement, Anneila Sargent for the Committee on Oversight, Maria Zuber for the Committee on Strategy, Julia Phillips for the Committee on National Science and Engineering Policy, and Maureen Condit for the Subcommittee on Honorary Awards.

Turning to Congressional engagement, Ochoa updated the Board on two virtual meetings she and Vice Chair McCrary had with Congressional offices following the release of the Board's *Vision 2030*. The first meeting was with Representative Frank Lucas, the Ranking Member of the House Committee for Science, Space, and Technology. Rep Lucas began the conversation with the pivotal question the Board asked itself during the entirety of its vision development, "How can we make sure the accomplishments of the past 50, 60, 70 years can be continued?" Ochoa added that Lucas was very interested in the impacts COVID-19 is having on early career researchers and expressed his frustration at the infrastructure deficiencies being highlighted by the COVID crisis, such as the lack of broadband across the country. The second meeting was with Representative Eddie Bernice Johnson, Chair of the House Committee for Space, Science and Technology. Ochoa reported that she and McCrary provided Johnson with a high-level summary of the Vision. Johnson expressed strong support for the Board's work and stated that she looked forward to working with the Board on the issues raised in the Vision. Rep. Johnson expressed particular interest in the matter of domestic STEM talent development and the challenges with maintaining an attractive outward view for foreign-born students and researchers. Ochoa mentioned that McCrary and Johnson had a strong connection on the issue of Skilled Technical Workforce development.

Ochoa concluded her remarks by noting to Board members that *Vision 2030* is being read and gaining attention with key stakeholders. She added that while this is great news, it also creates expectations that we follow through on the Roadmap items to realize the vision. With that segue, she moved on to the next agenda item, an update from the Vision Implementation Working Group. (VIWG)

NSB *Vision 2030* Implementation Working Group Update

Before handing the floor to NSB Vice Chair McCrary to report on the work of the Working Group, which he chairs, Ochoa provided introductory remarks. She reminded the Board that the overall message of the vision is to urge the nation to retain U.S. lead in fundamental research, to empower U.S. businesses to globally succeed, and to increase STEM skills and opportunities for all Americans. She continued by highlighting two major pillars of the Vision Roadmap, Deliver

Benefits from Research and Develop STEM Talent for America. She stated that these areas of focus are of immediate importance to the country and of keen interest to S&E stakeholders.

Ochoa then announced the members who comprise the VIWG chaired by Board Vice Chair McCrary. In addition to McCrary, they include Roger Beachy, Maureen Condic, Dario Gil, Julia Phillips, Alan Stern, and Maria Zuber. The VIWG also includes Saul Gonzalez as a liaison from NSF. Ochoa added that the membership represents all classes of the Board as well as all of the Standing Committees of the Board. She then turned the floor to VIWG Chair McCrary.

McCrary began by thanking the VIWG members for their service. He provided a brief history of the Vision 2030 project and reiterated the theme of Ochoa's introduction to the session, reminding the Board members that the goal was to write a vision that was big, bold, and actionable. McCrary continued with a summary of the four major Roadmap themes, Deliver Benefits from Research, Develop STEM Talent for America, Expand the Geography of Innovation, and Foster a Global S&E Community.

McCrary then provided an update on where the vision implementation efforts stood. He noted that the VIWG had already met a number of times to develop an implementation plan matrix based on the Vision Roadmap. The matrix was provided in the Board Book for this Board Meeting. There was also a presentation of the matrix to NSF senior leadership the day prior to the July Board Meeting. McCrary noted that the September 2020 Board Retreat would be an opportunity for the members and NSF leadership to continue the discussion of the Roadmap and specific the matrix items. McCrary added that the VIWG recognized the volume of items in the Roadmap required prioritization based on desired time horizon for an item's completion and any given item's current state of development. He echoed Ochoa's assessment that the two focus areas for immediate action were Deliver Benefits from Research and Develop STEM Talent for America.

Following McCrary's presentation, NSF Director Panchanathan expressed his strong support for the Vision and welcomed a strong and active partnership between the Foundation and the Board in realizing the potential of the Vision. Julia Phillips, Chair of the Committee on National Science and Engineering Policy (SEP) added that the Vision has provided a very useful roadmap for the committee work of the Board. Member Maureen Condic thanked McCrary and his colleagues on the VIWG for identifying a clear list of actionable priorities on which the Board can focus. Member Roger Beachy mentioned the importance of getting the new members integrated into the Board's Vision implementation work. He noted that while they were not part of the drafting of the document, their commitment and contributions will be integral to its realization.

NSF's HBCU Program Overview Brief

Next on the agenda was a briefing by Claudia Rankins, Program Director for NSF's Historically Black College and Universities Undergraduate Program (HBCU-UP). Following an introduction by Karen Marrongelle, AD for the Directorate for Education and Human Resources, Rankins began by providing a brief background on HBCUs and NSF's funding history of them. Rankins stated that the history of HBCUs predates and transcends the American Civil War.

Approximately half of them are private and their numbers include community colleges. She added that HBCUs are leaders in graduating STEM-educated Black students who go on to

receive S&E doctoral degrees. In terms of NSF funding, Rankins reported that HBCUs received about \$100 million per year between 2009 and 2018, about 40% of which goes toward R&D. Of the \$100 million per year, 70% goes to the top 20 HBCUs. Rankins noted that the NSF funding for HBCUs, in general, is far surpassed by R1 universities. For example, she stated that the top 4 R1 institutions receive approximately \$400 million in NSF R&D funding each year. All 101 HBCUs combined receive this amount for R&D each decade. Contributing to the lack of impact in the research area for HBCUs is the fact that the vast majority of NSF funding to HBCUs comes from the Directorate for Education and Human Resources, with other research directorates lagging far behind.

Rankins then addressed NSF efforts to increase the engagement between the Foundation and HBCUs with the goal of promoting collaborations and outreach. She reported that a series of workshops and webinars have resulted in increased proposal submissions and subsequent awards from HBCU researchers. She concluded by looking at the opportunities and challenges facing HBCU's. On the opportunity side, Rankins stated that HBCU faculty is poised to do research. They have demonstrated through the decades of their existence that HBCU's know how to navigate challenging times and continue to connect research to community betterment and to the cultural context of the institutions. Rankins added that the challenges can be summed up in six words: systemic and historic underfunding of HBCUs.

Board Chair Ochoa then opened the floor for questions.

Geri Richmond asked about the effects of the COVID-19 pandemic on the financial stability of HBCUs. Rankins stated that it is certainly a major concern for those that were already vulnerable before the pandemic began. The good news is that the faculties and institutions have not stopped researching and teaching in this new environment. Rankins reported that proposals continue to come in and the summer programs run by HBCUs continued despite the logistical challenges. Richmond asked a follow-on question concerning the teaching loads at many HBCU's, particularly the smaller ones, that may prevent faculty from conducting much research. Rankins responded that it is an issue, but NSF is working to assist in providing academic release times for those in that situation in hopes of providing research opportunities.

Maureen Condic asked about the basis for comparison that led to the statement "Systemic and historical underfunding has been an ongoing challenge." Rankins replied that she did not have the data at her fingertips but would be happy to dig it up and forward to Condic.

Dario Gil asked about ways in which NSF could serve as a catalyst for private sector entities seeking to engage more closely with HBCUs. Rankins responded that there are ongoing efforts in this area. One factor that she highlighted was the need for both the individuals and the institutions to feel welcome and as a valued partner in the relationships. She indicated that in some instances that has not been the case.

Stephen Willard asked about the potential to leverage the great track record of mentoring that exists in HBCUs and inculcate that culture into other undergraduate and graduate programs. Rankins indicated that all institutions take mentoring seriously, HBCUs and non-HBCUs. She argued that the key is to make all students feel welcome. The students at HBCUs see people who serve as role models that look like them. In far too many other institutions that is not the case. Her conclusion was that in the 4400 institutions that are not HBCUs, where 91% of Black students attend higher education programs, these students need to be welcome and empowered to thrive.

Steve Leath commented on the successful proposal by the University of North Carolina system while he was the Vice President that led to the first Engineering Research Center to be funded at an HBCU, North Carolina A&T. He asked if any has been funded since. Rankins said no. That was the first and only major center funded to an HBCU.

External Panel: Framing Black Experiences In S&E

Ochoa continued the meeting by introducing the next session, a panel of five guest speakers to discuss the Black experience in science and engineering. She turned the floor to Victor McCrary, who moderated the panel. McCrary introduced the panelists: William Jackson, Distinguished Research and Emeritus Professor of Chemistry at UC Davis, Stephon Alexander, President of the National Society of Black Physicists and Professor of Physics at Brown University, Stephani Page, Community Engagement manager at the Advance Resource and Coordination Network, Kelly Mack, Vice President for Undergraduate STEM Education and Executive Director of Project Kaleidoscope at the Association of American Colleges and Universities, and Eugene DeLoatch, Dean Emeritus of Engineering at Morgan State University.

Following some introductory remarks, McCrary asked all panelists to respond to the question:

As stated in NSB's Vision 2030 report, the number of Black people in the S&E workforce must more than double over the next 10 years. Based on your unique perspectives, what do you think NSB/NSF should do over the next 10 years to make S&E research enterprise and attractive and welcoming environment for Black people. And what does success look like for you?

Jackson focused his remarks on the disparity of funding between HBCUs and Primarily White Institutions (PWIs). He used his own experiences at Howard University (HU) and the University of California, Davis (UC-Davis) to illustrate his points. He stated that when UC-Davis and HU had the same number of students, and dedicated federal funding, funding at UC-Davis was twice that of HU. He also pointed to the lack of Black faculty who can serve as mentors at PWIs.

Page noted that, despite one-two generations difference in age, her experiences in the S&E environment and those of Jackson were remarkably similar. Stating the obvious, she said this was unacceptable. She called for NSF and NSB to hold individuals and institutions accountable for acts and cultures of systemic racism. She also noted that the number of Blacks in faculty and administrative leadership positions in academia is not consistent with the numbers of Blacks educated by these same institutions. She argued that if the schools could educate them, they can also hire, nurture, and promote them.

Alexander focused on the grant review process recommending greater transparency and ensuring that review panels are both demographically and culturally diverse.

DeLoatch advocated for the creation of an EPSCoR-like program to increase the number of Blacks and other people of color in engineering programs and careers. He added that such a program should not be limited to funding at HBCUs. He also lamented the statistic that 50% of PhD Engineering degrees are awarded to foreign students. He suggested a recalibration of the strategy that finds the investments for foreign training but struggled to promote and fund domestic STEM talent.

Mack lauded the NSB for its June 2020 statement against racism in S&E. She strongly advocated for NSF and NSB to make a sustained effort to remedy implied bias and explicit racism in the

programmatically decisions of the Foundation. She challenged to Board to exert the same amount of energy in working against racism S&E that it intends to exert in publicizing and implementing Vision 2030.

Board member comments following presentation supported many of the specific ideas put forth by the panelists. Geri Richmond added to many of the points raised by suggesting that there needs to be a better way for students to be advised who the good mentors and advisors are and who students should avoid. She also called on the Board to challenge NSF to increase diversity in its program staff and create means by which PIs can report, safely and transparently, bias they have either witnessed or experienced.

NSF Director Panchanathan announced that he had established a racial equity task force to identify and address barriers to racial and gender equity across the Foundation and the programs that it funds.

Session 2 (July 30, 3:47–4:00 p.m.)

Chair's Remarks

NSB Chair Ochoa welcomed the NSF staff, guests, and members of the public listening via webcast. She began the session by welcoming new staff to the NSB Office. Alison Gillespie joined the Office in June as a Communication Specialist and AAAS Science and Technology Fellow Michelle McCrackin will be staying in on as a full-time civil servant beginning September 1. She will be filling one of the Science and Engineering Policy Analyst positions.

Ochoa also announced the creation of the Board Retreat Organizing Committee. The committee will include Roger Beachy, Chair, Steve Leath, and Suresh Babu. She reminded members that the retreat is scheduled for September 15-16.

Approval of Prior Minutes

Ochoa presented the minutes of the May Open Plenary for approval. Those minutes were approved as presented.

NSF Director's Remarks

NSF Director Panchanathan began by addressing the issues raised in the media concerning NSF's statement on the most recent Graduate Research Fellowship Program solicitation. The statement accompanying the solicitation highlighted the strategic importance of areas of innovation in AI, quantum information science, and other emergent areas. This was interpreted as a notice that priority consideration would be given to applications for GRFs in these areas at the expense of the wider sciences NSF has traditionally funded. Panchanathan wanted to make clear that the addition of these focus areas would in no way exclude any area of science and that the traditional merit-based system of GRF selection would be used.

Panchanathan continued by calling the Board's attention to the written update of OLPA activities that was in the Board Book. He specifically thanked OLPA for its great work in getting the word out regarding the extensive activities of NSF in response to the COVID pandemic.

He concluded by introducing Dr. David Berkowitz as the new Division Director for the Division of Chemistry in the Directorate for Mathematical and Physical Sciences.

Open Committee Reports

NSB Chair Ochoa then turned to the open committee reports.

Maria Zuber reported for the Committee on Strategy (CS). She stated that the committee received updates on NSF's FY 2020 and 2021 appropriations as well as the FY 2022 budget development. She added that the committee also received briefings on NSF's skilled technical workforce portfolio and spectrum management.

Julia Phillips reported for the Committee on National Science and Engineering Policy (SEP). She stated the committee received an update from NCSES on the review process for the 2022 edition of the *Science and Engineering Indicators* thematic reports. The committee also received a briefing on the impact of COVID-19 on data collection, data quality, and the opportunities in new and alternative data to reflect fast moving trends. Finally, Phillips stated that the committee presented three possible policy topics that warranted consideration for developing policy documents based on *SEI 2020*. Those topics were nurturing U.S. science and engineering talent, economic impact of fundamental research, and economic impact of international students and workers.

Anneila Sargent reported for the Committee on Oversight (CO). She stated that the committee received a briefing from OIA about the 2019 Merit Review Digest and ongoing efforts to modernize the Digest and associated online modules. The committee also discussed broader impacts as they relate to implementing the *Vision 2030* recommendations. Sargent reported that there were robust discussions on the Merit Review Digest and the broader impacts topics. The committee also heard updates from the Office of Inspector General (OIG) and the Chief Financial Officer. Mike Wetklow presented a status update on NSF's enterprise risk management.

Dan Reed reported for the Committee on Awards and Facilities (A&F). He stated that the committee heard presentations from NSF on the effects of the COVID-19 virus on NSF-funded research infrastructure and on operations in the polar regions. He stated that the committee also received a written update from GEO Sciences on the NCAR facility.

Geri Richmond reported for the Committee on External Engagement (EE). She stated that the committee focused on laying out the main areas in which the committee will focus over the next three years. They include strategic engagement with partners to advance the Vision 2030 Roadmap actions, expanding Board engagement with Congress, and ensuring NSB is prepared to respond to emerging events and community concerns. The committee also announced that the nominations period for the Board's annual honorary awards was open and Maureen Condic will be chairing that activity.

Votes

Ochoa then turned to the items needing Board approval. She asked for a motion to approve the 2021 annual Board calendar that was included in the Board Book. The calendar was approved as presented. She also requested approval to accept the 2019 Merit Review Digest that was recommend to the full Board from the Committee on Oversight. The Digest was accepted as presented.

Chair's Closing Remarks

Ochoa concluded the meeting by announcing Board Executive Officer John Veysey's official promotion to the Senior Executive Service. She also thanked the Board office for its work in organizing and conducting the virtual meeting.

There being no further business, the meeting was adjourned at 4:06 p.m.

X



Brad Gutierrez, Ph.D.
NSB Executive Secretary
Signed by: BRAD A GUTIERREZ