

**APPROVED MINUTES  
PLENARY OPEN SESSION  
467<sup>TH</sup> MEETING  
NATIONAL SCIENCE BOARD**

National Science Foundation (NSF)  
Via Videoconference  
May 5-6, 2020

**Members Present:**

Diane Souvaine, *NSB Chair*  
Ellen Ochoa, *NSB Vice Chair*  
John Anderson  
Roger Beachy  
Arthur Bienenstock  
Vicki Chandler  
Maureen Condic  
W. Kent Fuchs  
Suresh Garimella  
Robert Groves  
James Jackson  
Steven Leath  
W. Carl Lineberger  
Victor McCrary  
Emilio Moran  
Sethuraman Panchanathan  
G.P. Bud Peterson  
Julia Phillips  
Daniel Reed  
Geraldine Richmond  
Anneila Sargent  
Alan Stern  
Stephen Willard  
Maria Zuber

**Members Absent:**

Kelvin Droegemeier, *ex officio*\*

There being a quorum, the National Science Board (NSB, Board) convened in Open Plenary Session at 11:00 a.m. on Tuesday, May 5, 2020, via videoconference with NSB Chair, Dr. Diane Souvaine, presiding.

## NSB Chair's Opening Remarks

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Dr. Souvaine welcomed everyone to the NSB's 467<sup>th</sup> meeting. She began the meeting by welcoming the announced new members of the Board Class 2020-2026. They included Suresh Babu from the University of Tennessee, Knoxville, Aaron Dominguez from Catholic University of America, Dario Gil from IBM, and Heather Wilson from the University of Texas, El Paso. The new class also includes current Board member Roger Beachy from Washington University of St. Louis whose reappointment was announced with the other new members.

Dr. Souvaine continued by welcoming back to NSF as the Acting Director, Kelvin Droegemeier, who served on the Board from 2004-2016. Dr. Droegemeier expressed his gratitude for the welcome and emphasized that he was just keeping the seat warm until Director-nominee Sethuraman Panchanathan is confirmed by the Senate.

Dr. Souvaine then turned the floor over to Dr. Droegemeier for the Director's remarks.

## NSF Acting Director's Remarks

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Dr. Droegemeier focused his remarks on two major issues, (1) ensuring the safety and well-being of the NSF staff during the COVID crisis and (2) planning for the restart of NSF funded research and looking for ways to use lessons learned from the crisis to reinvigorate NSF's research. He applauded the efforts of the Office of Information and Resource Management led by Wonzie Gardner for their efficient planning to facilitate full-time telework for the entire agency and for their continuing work with OPM to plan for the NSF headquarters reopening, once it is safe to do so. Dr. Droegemeier also described actions being taken by program officers, universities, NSF OIG, and the various directorates to facilitate ongoing research that can continue and plan for the reopening once it begins. He called on all of NSF to think innovatively and boldly about the future post-pandemic. What can the agency learn and what should the agency do differently based on the COVID experience? Dr. Droegemeier added that he would be holding a Town Hall for all NSF staff on May 7 via videoconference.

## NSB *Vision 2030* Rollout

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Dr. Souvaine continued the meeting by announcing the rollout of the Board's long anticipated *Vision 2030*. Calling it one of the seminal documents of her twelve years on the Board, Dr. Souvaine began the presentation by thanking Dr. Roger Beachy, Chair of the Vision 2030 Task Force, Dr. Ellen Ochoa, Vice Chair of the Task Force and other Task Force members, Drs. Chandler, Groves, Phillips, and Zuber.

In describing the motivation for the Board's *Vision 2030* initiative, Dr. Souvaine stated that the Board set out to draft a document that was big, bold, and actionable providing a vision for where the U.S. science and engineering must be in 2030 to remain a global S&E leader. The vision was also designed to address both of the Board's statutory mandates, the governing body of the Foundation and independent advisors to the President and Congress on science and engineering matters.

After describing the process the Board utilized to conduct stakeholder outreach and research for the vision, Dr. Souvaine provided some statistical context for the global S&E environment. She then passed the floor to Dr. Beachy, Chair of the Vision Task Force. Dr. Beachy explained the three strategic questions that drove the *Vision 2030* Project. First, how can America keep its lead in fundamental research? Second, how can American discoveries continue to empower U.S. businesses and enterprises to succeed globally? Third, how can the U.S. increase STEM skills and opportunities for all Americans? He then emphasized that the answers to these questions requires the commitment of all entities in the U.S. S&E ecosystem. Private industry, academic institutions, and government agencies must approach the issue in an integrated and coordinated manner. He continued by laying out the four critical elements that will contribute to long-term success in sustaining U.S. leadership, practice of science and engineering, development of STEM talent, maintenance of strong S&E research infrastructure, and creating and sustaining meaningful partnerships across agencies, industries, and, in many cases, countries. Dr. Beachy then turned the floor to Dr. Ochoa, Vice Chair of the Vision Task Force, to discuss the Vision Roadmap.

Dr. Ochoa emphasized that implementation of the Roadmap will require Board engagement with a wide range of stakeholders, internal and external to the NSF. She highlighted the four main areas of the Roadmap, delivering benefits from research, developing STEM talent for America, expanding the geography of innovation, and fostering a global S&E community. After providing some additional detail on these four areas, Dr. Ochoa concluded her remarks by encouraging people to offer feedback to *Vision 2030* and the proposed Roadmap activities via [NSBVision@nsf.gov](mailto:NSBVision@nsf.gov).

## NSF's Response to COVID-19

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Dr. Souvaine concluded the session by turning the floor over to Dr. Fleming Crim, NSF Chief Operating Officer, who provided an introduction to the Foundation's briefing to the Board on NSF's response to date to the COVID-19 pandemic emergency. Dr. Crim began by acknowledging the considerable impact the COVID-19 crisis has had on both NSF internal operations and the wider community the Foundation serves. He said that the goal of the presentation was to provide the Board with a high-level overview of the NSF response to date and to learn what was on Board members' minds regarding the public health situation.

The presentation began with remarks from Mr. Wonzie Gardner, the Head of the Office of Information Resource Management (OIRM). Mr. Gardner walked the Board through the agency's approach to ensuring employee safety and well-being. He discussed the work/life flexibilities that have been put in place to respond to the myriad of individual circumstances including dependent care requirements, Employee Assistance Program virtual counseling, and greater flexibility on work hours, to name a few. He also spoke about the sustained support measures adopted to ensure minimal disruption of the mission. This included cessation of network password expiration, waiving PIV card expiration and shifting IT HELP to a virtual system focused on supporting remote work. Dr. Gardner concluded by briefly outlining the most recent guidance they have received from OMB and that guidance which NSF has provided to external stakeholders.

Dr. Sylvia James, Deputy Assistant Director for the Directorate for Education and Human Resources, continued the briefing with a presentation on NSF's initial research recovery planning activities. She noted that the information was very preliminary as the Research Recovery Task Force was in its infancy. She highlighted a number of ways the pandemic had affected the research enterprise and reactions to those disruptions in the form of letters to Congress from professional associations and articles in science journals. She stated that the Research Recovery Task Force was working along three broad themes to address both the people and infrastructure dimensions of the crisis. These themes are research recovery, maintaining the STEM talent pipeline, and ensuring NSF's capacity to implement an efficient recovery. She concluded by stating that a more comprehensive report would be forthcoming by the end of the summer.

Dr. James Ulvestad, Chief Officer for Research Facilities (CORF), provided an update on the impact of COVID-19 on NSF's major facilities portfolio. Dr. Ulvestad began by reminding the Board that the major facilities are operated by managing entities through cooperative agreements with NSF. They have the direct decision-making authority regarding operations. He noted that in close coordination with NSF, the facility managers have placed a premium on safety of the staffs and researchers. Dr. Ulvestad continued by stating that most facilities had suspended science and on-site operations by early April, with remote-capable facilities operating as able.

Dr. Joanne Tornow, Assistant Director for the Directorate for Biological Sciences, concluded the briefing with a presentation on the science of COVID-19 and the many research projects, that were currently being funded by NSF (including through RAPID awards) to better understand the virus and its behavior.

The floor was then opened to questions from the Board.

Dr. Bienenstock began by asking about the level of coordination with other agencies and international partners in the planning for COVID response and reopening. Dr. Ulvestad responded that NSF is in close contact with interagency, international, and managing entity partners to ensure that decisions made regarding facilities.

Dr. Garimella asked about the plans for supporting graduate students, post-docs, and early-career faculty whose research may have been interrupted. Dr. James responded that NSF has published guidance on their website for individuals currently on awards to seek information on procedures to ensure continued support and managing research flexibilities.

Dr. Stern asked about the contingencies in place for Antarctica. Dr. Falkner, Head of the Office of Polar Programs, responded that the situation is multi-faceted due to the logistical challenges and the isolated location that can make any medical situation potentially worse than if it occurred in the U.S. She added that the first priority has been to make decisions that would maximize the safety and welfare of those people currently on the ice. In terms of specific medical equipment, Dr. Falkner added that NSF is working with international partners and FEMA to evaluate the best course of action to treat or evacuate someone who may contract COVID in Antarctica.

Dr. McCrary asked if the lanes between NIH and NSF research been blurred during the crisis in order to get resources to those who need it to do the research required. Dr. Tornow responded that the BIO Directorate has been looking with a broader lens than is typical and has also opened conversations with non-traditional partners, such as the CDC, in order to provide support where it can best be utilized.

Dr. Droegemeier added that OMB and Congress are very interested in the efforts of all federal research agencies to minimize the long-term impact of this crisis on the U.S. research enterprise. He stated that number of professional organizations have communicated with members of Congress regarding their concerns about the well-being of the science and engineering community. Ms. Greenwell, the Head of the Office of Legislative and Public Affairs, added that NSF has been very engaged with the Foundation's oversight committees on the Hill to keep them informed of NSF's efforts in the area.

Dr. Condic asked if there were any lessons that can be extended beyond the duration of the current situation regarding the flexibility of teleworking and what provision are being considered for grant extensions to those individuals who have had their research adversely impacted by the shutdown. Dr. Crim and Mr. Gardner both responded that the expectations that some had in terms of workplace productivity in an all-remote work environment have been hugely exceeded. They acknowledged that if one thing has been proven to be true it is that the completion of the mission of NSF does not depend on the building on Eisenhower Avenue in Alexandria. Mr. Gardner also acknowledged that one challenge has been to manage work-life balance. The convenience of having access to work materials 24-7 has made it tempting for some to extend the workday at the expense of personal time. On the issue of grant extension flexibility, Dr. Stephen Meacham responded that the Research Recovery Task Force is examining the mechanics of that process and what additional resources may be required.

Dr. Souvaine concluded the session by thanking Dr. Crim and his team for an outstanding presentation and a very informative discussion.

## **Session 2 (May 6, 4:00–4:45 p.m.)**

### Chair's Remarks

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Dr. Souvaine welcomed the NSF staff, guests, and members of the public listening via webcast. Dr. Souvaine began by announcing the results of the Board elections held during the Executive Plenary Closed session. She stated that Dr. Ellen Ochoa was elected Board Chair for the 2020-2022 Board term and Dr. Victor McCrary was elected Board Vice Chair for the same term.

Dr. Souvaine then turned the floor over to Dr. Ochoa for some remarks. Dr. Ochoa thanked her colleagues for their vote of confidence in electing her to be their Chair and congratulated Dr. McCrary on his election as Vice Chair. She then offered words of gratitude and praise to Dr. Souvaine for her leadership and service to the Board. Dr. Ochoa then asked Dr. Veysey to say a few words on behalf of the Board Office. Dr Veysey expressed the Board Office's gratitude to Dr. Souvaine for her 12 years of service to the Board and NSF.

Dr. Souvaine concluded her opening remarks by recognizing Mr. Edward Higgins, a PhD. Candidate from the University of Oklahoma, who was completing a spring term internship with the Board Office.

### Approval of Prior Minutes

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Dr. Souvaine presented the minutes of the February Open Plenary for approval. Those minutes were approved as presented.

## NSF Chief Operating Officer's Remarks

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Dr. Crim noted the written OLPA update in the Board Book and announced senior management changes across the Foundation. Dr. Gurdip Singh is the new Division Director for the Division of Computer and Network Systems in the Directorate for Computer and Information Science and Engineering. Dr. Sean Jones is the Acting Assistant Director for the Directorate for Mathematical and Physical Sciences. Dr. Tie Luo is the acting Deputy Assistant Director for the Directorate for Mathematical and Physical Sciences.

## Open Committee Reports

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Dr. Souvaine then turned to the open committee reports.

Dr. Beachy reported for the Committee on Strategy (CS). He stated that the Committee received updates on NSF's FY 2020 current plan, NSF's COVID investments, including supplemental funding through the CARES Act, and NSF's 2021 appropriation. The committee also received a highly informative presentation on the geopolitical role of the United States in the polar regions. Dr. Beachy concluded his report by thanking NSF staff, the NSBO staff and the other members of the Strategy Committee for their contributions over the past two years of his Chairmanship.

Dr. Beachy also reported on the work of the *Vision 2030* Task Force. He noted that the *Vision 2030* was officially unveiled during Day 1 of the Board meeting and moved that the Task Force be disbanded now that its work was complete. The motion was approved, and the Task Force dissolved.

Dr. Phillips reported for the Committee on National Science and Engineering Policy (SEP). She stated the committee provided an update on the schedule for release of the final thematic report of *Science and Engineering Indicators 2020*, and also presented the streamlined NSB review process for thematic reports that was approved by the committee to be used for the 2022 *Indicators* cycle. Finally, the committee discussed possible policy topics to work on in the coming year, informed by *Indicators 2020* data and analysis. Three broad themes were presented: the importance of fundamental research, nurturing the U.S. science and engineering talent base broadly, and the need for the United States to be part of a global science and engineering collaboration. Dr. Phillips also thanked the NSF staff, the NSBO staff and the other members of the SEP Committee for their contributions over the past two years of her Chairwomanship.

Dr. Sargent reported for the Committee on Oversight (CO). She stated that the committee received an update on the status of the 2019 Merit Review Digest. The committee also heard updates from the Office of Inspector General (OIG) and the Chief Financial Officer. Dr. Sargent also thanked the NSF staff, the NSBO staff and the other members of the Oversight Committee for their contributions over the past two years of her Chairwomanship.

Dr. Lineberger reported for the Committee on Awards and Facilities (A&F). He stated that the committee heard a presentation from NSF on the effects of the COVID-19 virus on NSF infrastructure and received a written update on the Ocean Observatories Initiative that had been requested when the latest O&M award was authorized in May 2018. Dr. Lineberger also thanked

the NSF staff, the NSBO staff and the other members of the A&F Committee for their contributions over the past two years of his Chairmanship.

Dr. Jackson reported for the Committee on External Engagement (EE). He stated that the committee received updates on a number of ongoing initiatives but focused primarily on a discussion of possible engagement opportunities associated with the Board's *Vision 2030*. Dr. Jackson also thanked the NSF staff, the NSBO staff and the other members of the External Engagement Committee for their contributions over the past two years of his Chairmanship.

## Votes

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Dr. Souvaine then turned to the item needing Board approval. She asked for a motion to approve the annual Executive Committee Report covering the period May 2019-2020. The Report was approved as presented.

## Chair's Closing Remarks

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Dr. Souvaine conclude the meeting by offering a retrospective look at her 12-year tenure on the Board, including the last two years as Chair. She also made brief presentations on each of the other outgoing members of the Class of 2014-2020. Her retrospective is included here in its entirety for posterity:

“As we near the close of this 467th meeting of the National Science Board, I'd like to share a few reflections from my nearly 12 years on the board. Certainly, during this time, there have been innumerable activities and decisions to which to point as accomplishments. For example, the Board has authorized the construction and/or operations funding of many NSF's current iconic research facilities: IceCube, Atacama Large Millimeter Array (ALMA), Ocean Observatories Initiative, Advanced Laser Interferometer Gravitational-Wave Observatory (LIGO), and the Large Synoptic Survey Telescope (LSST). And the Board supported NSF's commitment to upgrade and modernize the Foundation's Antarctic facilities through the Antarctic Infrastructure and Modernization for Science program.

In addition, the Board established a number of task forces and working groups to examine elements of NSF mission, to include merit review, administrative burdens, midscale research, major facilities operations and maintenance, and broader issues on the skilled technical workforce and the value of higher education in the United States. This is an impressive list of accomplishments.

What is more remarkable to me than the accomplishments themselves, however, is the steady way that the Board has grown and transformed itself from 2008 to the present day in order to produce these results, something that is a credit to each person who served or serves on the NSB or in the NSBO. Significant challenges such as the DUSEL I-Plant, NEON, and NNIN projects, prompted deep thinking and the development of new mechanisms of interaction. And they required inputs from multiple constituencies and insightful engagement from all NSB members to reach resolution. They encouraged introspection within the NSB on the nature of its responsibilities and how best to fulfill them and how best to generate positive impact, both for NSF and for science and engineering writ large.

Through the passion, initially of individuals and, over time, of the collective whole, the Board successfully and successively created the task forces and the working groups mentioned above, focusing on timely areas for the Board's specific attention. It also undertook a complete review of its committee structure and activities as well as its relationship with NSF and its overall statutory charge.

Retreats and subsequent meetings both explored the difference between management, the responsibility of NSF senior management, and governance, the responsibility of the NSB. These discussions divided the roles of the Board into the fiduciary, the strategic, the generative, ultimately producing a new committee structure. The new structure built an understanding of preventable, external, and strategic risks that informed the development and publication of the Board's risk philosophy and principles early in 2018 that now shapes the tone of the dialogue between the Board and the Foundation on the shared programmatic oversight responsibilities.

This evolution or, perhaps, revolution, of the NSB happened in close coordination with the NSF. Long-time observers of the Board will recognize that the current strong relationship between the Board and the Foundation leadership is not a given, and it's not a product of happenstance. My predecessors in the Board Chair seat established a solid foundation with recently retired Foundation Director France Córdova, one that existed throughout the generative activities just described and upon which Ellen and I could continue to build with France and with Fleming.

Just as the Board is strongest when its members speak with one voice, the Foundation is strongest when the Board and the Foundation leadership work together in their respective roles to further the agency's mission and support its outstanding, dedicated staff. I shall be excited to watch Ellen Ochoa and Victor McCrary, together with Director-designate, Sethuraman Panchanathan, and Chief Operating Officer, Fleming Crim, continue on this path.

All of this set the stage for one of the most invigorating and challenging tasks undertaken by the Board during my 12 years of service, the *Vision 2030* initiative, first suggested by Roger Beachy at the July 2018 Board meeting. The document became the hallmark product of my tenure, one in which each and every NSB member played a critical part as did our NSBO and NSF colleagues and where diverse backgrounds, and opinions, and visions have come into a cohesive whole.

What stands out in this document is the breadth of its treatment of issues critical to the sustainment of U.S. leadership in the global science and engineering enterprise. As a guiding light for future Board work, it stands on the shoulders of many of the preceding reports and studies I mentioned above. For those of us in the class of 2020 who will be leaving the Board, we should look back on this vision with pride. In my mind, it represents the best of what this body can do when the collective intellect and experience of its members is brought to bear on a challenge. I and my classmates look forward to seeing where this document leads the Board and the Foundation in the coming decade and beyond.

At various points in the past few years there've been discussions on the Hill and elsewhere as to the right size of the NSB. Is 24 too many? Should it be 18 or 12? As I prepare to leave the Board, I would assert that 24 is exactly the right size. We need the breadth and diversity and the person-power to execute the work of this Board. And the ideas that have driven the NSB forward have come from inspired interactions among these 24 individuals. As I look now at my screen and at the thumbnail images of all of my fellow Board members, I can recognize that over my time here, each and every one of us has been the one with the catalyzing observation in one discussion or another. Each member has been invaluable to the whole. And we need all of us.

So speaking directly to my fellow NSB members, whether those with whom I have served for 12 to 18 months, or for 10 to 12 years, or any place in between, but especially to my fellow members of the graduating class of 2020, it's been one of the great privileges of my lifetime to serve with you in this most noble of undertakings. We've all dedicated our lives to the advancement of knowledge. Being able to serve that cause for the betterment of this country's premier fundamental science and engineering research agency is a high honor. I'm so very grateful for the opportunity that I've had to do so with you.

And to my co-conspirator for all of my 12 years on the Board, Bud Peterson, I add an extra thank you. I couldn't have chosen a more dignified, principled, and dedicated public servant with whom to spend those last 12 years.

To the NSF staff and leadership, I offer my sincerest best wishes for continued success. I am confident that under the leadership now with Kelvin and Fleming, and soon with Panch and Fleming, you will continue to do great things for this country. I celebrate your passion and commitment. And I will be forever indebted to the tireless efforts of those who kept the trains running during the 2019 lapse in government funding, and to all who now work under extraordinary circumstances to promote, protect, and preserve researchers, research, and research infrastructure at all levels, these efforts exemplify the character of this organization and its people.

Finally, I come to the men and the women of the National Science Board office. The office's mission is to -- I quote, "advise and assist," unquote, the Board. Wow. Those three words don't come close to capturing the contributions this merry band of 18 makes to the Board's success. Words seem inadequate to express my gratitude, admiration, and respect for the dedication and the commitment each and every one of you puts on full display every single day. There's not a single thing this Board achieves that does not have the Board Office's fingerprints deeply embedded in its fiber, whether it be travel arrangements and vouchers, to catering for meetings and events, to talking points and background documents for Board meetings and Hill visits, to the invaluable liaising that you do with NSF staff and leadership in our absence, to the endless drafts of reports you prepare for our review and critique. You are all the engine that keeps the train running. And I thank you from the bottom of my heart. I know you will remain in good hands with the exceptional leadership of John Veysey.

So, let me finish by saying what a thrill it has been these past two years as NSB chair and these past 12 years as your colleague. Thank you all. And in particular, I want to say what a pleasure it has been to be a member of the eight-person class of 2020 that graduates in just a few days on May 10th. We have worked hard, made enduring friendships, and I believe, are leaving the Foundation in a better place than we found it. Who could hope for more?"

Following her comments to the Class of 2014-2020, and there being no further business, the meeting was adjourned at 4:45 p.m.

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