

National Science Foundation  
Directorate for Biological Sciences

Advisory Committee Meeting  
October 29-30, 2020  
Virtual Meeting

Summary Minutes

**BIO Advisory Committee Members in Attendance:**

Dr. Carla Cáceres (Chair)	Dr. Benjamin Garcia	Dr. Lucinda McDade
Dr. Suzanne Barbour	Dr. Susan Gregurick	Dr. Gretchen North
Dr. Barbara Beltz	Dr. Michael Ibba	Dr. Diane Pataki
Dr. Jeannine Cavender-Bares	Dr. Richard Kuhn	Dr. Maria Pellegrini
Dr. Thomas Daniel	Dr. C. Robertson McClung	

**BIO Advisory Committee Members Not in Attendance:**

Dr. Paul Turner

**Thursday, October 29, 2020**

Dr. Joanne Tornow, National Science Foundation (NSF) Assistant Director for Biological Sciences (BIO), convened the meeting at 10:00 AM EST by welcoming the Advisory Committee (AC) members, NSF staff, and guests.

Dr. Karen Cone, Acting Science Advisor for the Office of the Assistant Director for Biological Sciences, reminded the AC members of NSF virtual meeting polices and provided an overview of the Federal Advisory Committee Act (FACA) rules.

Dr. Carla Cáceres, Advisory Committee Chair, provided virtual meeting instructions and led the introduction of the AC members and NSF staff present at the meeting.

The AC unanimously approved the April 2020 AC meeting minutes without changes.

**BIO Update – *Dr. Joanne Tornow, Assistant Director for Biological Sciences***

Dr. Tornow provided an update on recent and planned BIO Directorate activities since the previous meeting. Topics covered included BIO's response to the COVID-19 pandemic; NSF leadership and BIO staff changes; the FY 2021 budget state; FY 2022 Administration priorities and their relation to BIO; programmatic activities updates; and a focus to increase broadening participation, including efforts aimed at mid-career stage advancement. Dr. Tornow also answered questions from the AC Members about how artificial intelligence will play a role in future BIO programmatic activities and noted a shift toward greater interdisciplinarity and collaboration seen in recent proposals.

**Discussion of Administration Priorities and BIO's involvement – *Dr. Alan Tessier, Deputy Assistant Director for Biological Sciences***

Dr. Alan Tessier, Deputy Assistant Director for Biological Sciences, presented the Administration's priorities outlined in the FY 2022 OMB/OSTP Memo on R&D Priorities and discussed how BIO's programmatic activities fall under the guidance. He noted the Administration's priorities increasingly focus on biological subject areas, such as the bioeconomy and the now-timely topic of infectious diseases. BIO AC members posed questions about research teams with greater interdisciplinarity, artificial intelligence, and the need for BIO to continue efforts to increase the visibility of the research it funds by focusing on its relevance to administration and national priorities.

***State of Higher Education in the time of COVID-19 – Dr. Michael Ibba, Advisory Committee Member***

Dr. Tornow set the context for the discussion by recognizing the challenges and impact on research and education at all levels caused by the COVID-19 pandemic and questioned how NSF can help to address those challenges. Dr. Michael Ibba, AC Member, moderated the discussion, which included the negative impact on student progression to degrees or postdocs moving to next steps in their career, resulting from a slow-down in hands-on research. Also, of concern are challenges of retention of underrepresented minorities and early-career faculty progression. It was noted the pandemic could vastly reduce the inclusiveness of research. NSF supplements to incentivize institutions, more mentoring opportunities for students, and professional society or industry partnerships were suggested as possible solutions to address challenges created by the pandemic. Dr. Tornow noted that BIO is working with existing resources to fund a balance of supplements and new awards to address this issue and help the community recover, all within the context of NSF priorities.

***BIO Investment in Integration – Dr. Carla Cáceres, Advisory Committee Chair; Dr. Karen Cone, Program Officer, Division of Molecular and Cellular Biosciences (MCB); Dr. Mamta Rawat, Program Officer, Division of Integrative Organismal Systems (IOS); Dr. Reed Beaman, Program Officer, Division of Biological Infrastructure (DBI); Dr. Amanda Simcox, Program Officer, DBI; Dr. Anne Sylvester, Program Officer, IOS***

BIO Program Officers Dr. Karen Cone (MCB), Dr. Mamta Rawat (IOS), Dr. Reed Beaman (DBI), Dr. Amanda Simcox (DBI), and Dr. Anne Sylvester (IOS) provided an overview on the BIO activities aimed at promoting integration across biological subdisciplines.

Dr. Cone spoke on the Understanding the Rules of Life (URoL): Epigenetics program, one of NSF's 10 Big Ideas, which ran for a second year in FY 2020 and funded awards relating the epigenome to a range of phenotypes at scales from molecular to social and behavioral. Dr. Rawat presented on the URoL: Microbiomes Theory and Mechanisms program, which seeks to establish theory and mechanisms that govern structure and function of microbiomes. Dr. Beaman discussed the BIO Rules of Life (RoL) Track that was embedded within the division core program solicitations for two years, and has served as a mechanism to support research integrating the subdisciplines of biology represented by BIO's four divisions. Dr. Beaman noted this track will be replaced by a dedicated solicitation in FY 2021. Dr. Simcox focused on the RoL Track within the Postdoctoral Fellowships in Biology Program. This new funding track in FY 2020 aimed to engage applicants who would integrate different biological disciplines to produce predictive theories or models and embrace broad thinking to address research problems. Dr. Sylvester provided an overview of the Biological Integration Institutes program, which supports research and training across broad biological themes that can best be addressed by integrative

teams and enable the discoveries of life's innovations. Dr. Sylvester outlined some common themes seen in the program's four Implementation awards

Dr. Cáceres led a discussion in which AC Members provided feedback on the program mechanisms. Discussion topics included engaging minority serving institutions, increasing training to broadening participation, creating opportunities for interaction among awarded investigators, and revising solicitation language to encourage collaborations between institutions for multi-disciplinary teams of investigators.

**Joint Session: Committee on Equal Opportunities in Science and Engineering (CEOSE) and BIO AC – Strategies for Broadening Participation – *Dr. Joanne Tornow, Assistant Director for Biological Sciences; Dr. Suzanne Barbour, CEOSE Liaison to BIO AC; Dr. Jose Fuentes, CEOSE Chair; Dr. Alicia Knoedler, CEOSE Vice Chair; Dr. Carla Cáceres, BIO AC Committee Chair***

Dr. Tornow began the joint session by welcoming the CEOSE members and outlined the vision of the session: to exchange thoughts on barriers to inclusivity, strategies for overcoming such barriers, and the role NSF can play. Dr. Suzanne Barbour introduced the CEOSE members. Dr. Jose Fuentes and Dr. Alicia Knoedler provided an overview of CEOSE's recent activities and lessons learned about strategies for overcoming barriers and increasing inclusivity. Dr. Knoedler explained that diversity should be reframed as an opportunity to integrate perspectives and to change minds rather than a problem to be solved, and she encouraged collaboration as a way forward.

The BIO AC and CEOSE discussed new strategies that could be employed to help inform BIO policies to address broadening participation, as well as some established programs and mechanisms that could be used to implement such strategies. It was noted that similar conversations about how to increase diversity are ongoing at other agencies. Dr. Barbour summarized the session by noting there should be a greater focus on institutional support for diversity, training opportunities, and program evaluations; she noted that BIO could be a leader in these efforts.

**Strategies for Broadening Participation, BIO AC only – *Dr. Suzanne Barbour, CEOSE Liaison to BIO AC; Dr. Patricia Serrano, Division Director, Division of Biological Infrastructure***

Dr. Patricia Soranno gave a presentation on BIO's commitment to broadening participation. She noted BIO recently revised several solicitations in the core programs to include updated language aimed at broadening participation. She also pointed to some effective strategies that have been informed by evidence-based approaches from CEOSE. Dr. Suzanne Barbour led the AC in a discussion centered around future strategies to broaden participation, including program evaluation and assessment of impacts, dedicated programs for faculty mentoring and retention, and possible roles for public-private partnerships.

**Update from Advisory Committee for Environmental Research and Education (AC-ERE) – *Dr. Diane Pataki, Advisory Committee Liaison to AC-ERE***

Dr. Diane Pataki provided an update from the AC-ERE, a committee that advises the NSF Director on research and education in environmental science. She explained that there are four subcommittees writing reports identifying gaps in four areas: environment and national security, stakeholder engaged

research, environmental education, and environmental and human health. The report on the latter topic was commissioned by NSF to advise on environmental impacts caused by the COVID-19 pandemic. There was discussion by AC members regarding the intersectionality and synergy between these topics.

***Around the Table – Dr. Carla Cáceres, Advisory Committee Chair***

Dr. Tornow requested the AC members consider topics of interest and ideas for discussion with the NSF Director for the following day. Dr. Cáceres created a draft agenda that focused on where BIO fits into the Administration's priorities and assigned AC members to lead each discussion topic. The AC members indicated the discussion topics of interest, which included investment in integration, higher education, broadening participation, and how BIO is supporting the use and maintenance of biological collections.

Dr. Tornow adjourned the meeting at 4:47 PM EST.

**Friday, October 30, 2020**

Dr. Tornow reconvened the meeting at 10:00 AM EST.

***Finalize talking points for Director's visit – Dr. Carla Cáceres, Advisory Committee Chair***

The AC members reviewed the draft agenda document prepared based on the previous day's last session and confirmed assignments to lead the discussion on each topic.

***Visit with NSF Director Sethuraman Panchanathan and Chief Operating Officer Fleming Crim – Dr. Sethuraman Panchanathan, Director of NSF; Dr. Fleming Crim, Chief Operating Officer, Office of the Director. Discussion led by Advisory Committee members Dr. Thomas Daniel, Dr. Michael Ibba, Dr. Carla Cáceres, and Dr. Lucinda McDade***

Dr. Sethuraman Panchanathan presented his vision of NSF: Strategy into the Future, Strengthening at Speed and Scale. He noted that innovation is built upon partnerships, acknowledged the prevalence of global competition, stressed the importance of true bipartisan support for science, and spoke about seeking methods to make fundamental research more inspiring to new generations. Following the presentation there was a discussion led by BIO AC Members Dr. Thomas Daniel, Dr. Michael Ibba, Dr. Carla Cáceres, and Dr. Lucinda McDade to share the AC's perspective on BIO activities and priorities.

Dr. Daniel led the discussion on BIO's involvement in administration priorities by noting how BIO continues to be a driving force for new technology. He highlighted the intersection with securing global leadership as pointed out in Dr. Panchanathan's presentation. Dr. Ibba headed the discussion on the state of higher education during the COVID-19 pandemic by highlighting the impacts on student training, faculty careers, and underrepresented minority opportunities. Dr. Panchanathan reiterated the importance of investing in future students and prioritizing easing the burden of the pandemic. Dr. Cáceres led the broadening participation conversation by noting the merits of increasing the definition of broadening participation to include local communities, encouraging the use of partnerships to sustain infrastructure, and highlighting successful projects as exemplars for best practices. Dr. Panchanathan supported the partnerships point and commented that NSF may have a role in facilitating that process.

Dr. McDade led the last discussion focused on biological collections. She noted the merits of collections, such as advancing research frontiers and expanding inclusivity, playing a major role in data mobilization, and providing training and STEM workforce opportunities. It was noted that collections data available online could be used to supplement education curricula during the pandemic. Dr. Cáceres wrapped up the discussion by thanking the Director and noting the excellent alignment of AC Members' perspectives with the Director's strategic vision and with Administration priorities.

***BIO investments in Collections – Dr. Lucinda McDade, Advisory Committee Member; Dr. Reed Beaman, Program Officer, Division of Biological Infrastructure***

Dr. Reed Beaman provided an overview of the current BIO investments in collections and plans for future activities. He reviewed the history of the collections programs in BIO and the vital role digitization plays in making data more accessible for research and education. At the same time, the volume of digitized data presents cyberinfrastructure challenges that must be overcome. Dr. Beaman cited recent reports from the Biodiversity Collections Network and the National Academy of Sciences, which describe opportunities for the Collections community, challenges, and possible solutions. Of note is a role for additional research coordination networks or action centers and a need for increasing investments in the workforce.

Dr. Lucinda McDade moderated the follow-up discussion, which focused on topics including partnerships with other federal agencies, a role for supporting collections in programs outside of DBI, and encouraging the use of collections in remote and online research opportunities.

***AC Summary, Future action items, Wrap-up – Dr. Joanne Tornow, Assistant Director for Biological Sciences; Dr. Carla Cáceres, Advisory Committee Chair***

Dr. Tornow requested the AC members consider topics of interest for the next AC meeting. The AC indicated they would be interested in learning more about partnerships, reviewing established programs that support students and higher education at other agencies to see how similar ideas could translate to NSF, and an update on broadening participation activities and on the No Deadline model with emphasis on early investigators. The AC reiterated its enthusiasm for meeting with ACs advising other directorates.

Dr. Tornow thanked AC members Dr. Susan Gregurick and Dr. Benjamin Garcia for their service as they have completed their three-year terms.

Dr. Tornow adjourned the meeting at 12:47 PM EST.