

National Science Foundation
Directorate for Biological Sciences

**Advisory Committee (AC) Meeting
November 3-4, 2021
Virtual Meeting**

Summary Minutes

BIO AC Members (*=new) in Attendance:

Dr. Carla Cáceres (Chair)	Dr. Michael Ibba	Dr. Diane Pataki
Dr. Suzanne Barbour	Dr. Richard Kuhn	Dr. Maria Pellegrini
Dr. Henry L. Bart Jr.*	Dr. C. Robertson McClung	Dr. Scott R. Santos*
Dr. Barbara Beltz	Dr. Lucinda McDade	Dr. Paul Turner
Dr. Jeannine Cavender-Bares	Dr. B Gail McLean*	Dr. Maria Uriarte*
Dr. Thomas Daniel	Dr. Gretchen North	Dr. Kennedy S. Wekesa*
Dr. Erich Grotewold*		

Wednesday, November 3, 2021

Dr. Alan Tessier, Deputy Assistant Director for the Directorate for Biological Sciences (BIO) at the National Science Foundation (NSF), provided an ethics briefing to the Advisory Committee (AC) members.

Dr. Joanne Tornow, Assistant Director (AD) for BIO, convened the open session of the meeting at 10:01 AM EDT by welcoming the AC members, NSF staff, and guests.

Ms. Montona Futrell-Griggs, Staff Associate for the Office of the Assistant Director (OAD) for Biological Sciences, reminded attendants of the FACA rules and NSF virtual public meeting policies.

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

The AC unanimously approved the minutes of the April 2021 AC meeting without changes.

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

Dr. Tornow provided an update on BIO activities since the previous meeting. Topics included recent BIO staff changes; budgetary updates; new and established programmatic activity updates; and how BIO is responding to the effects of the pandemic on vulnerable groups within the academic and research communities using both base and American Rescue Plan appropriations. Dr. Tornow answered questions from the AC on broadening participation, ongoing workshops, and new science themes within BIO programs. The AC expressed support for programs funding post-baccalaureate students and for the need to publicize various opportunities for Minority-serving institutions (MSIs). Dr. Tornow reminded the AC that since new BIO programs are publicized through her quarterly newsletters, AC members could contribute to BIO's outreach efforts by sharing the newsletters with their networks.

BIO Broadening Participation Portfolio – Dr. Patricia Soranno, Division Director, Division of Biological Infrastructure (DBI)

Dr. Soranno gave a presentation on BIO's cross-divisional efforts to support Diversity, Equity, and Inclusion (DEI) within STEM. Using a 'braided river' metaphor for the often-non-linear progression of STEM careers, Dr. Soranno described how BIO's recent solicitations (both new and revised) are intentionally aimed at providing support for researchers at multiple stages in the STEM career pipeline. These include: middle- and high school teachers via a new research experiences for teachers sites program; post-baccalaureates via supplements and a new opportunity for mentored research networks; early-career faculty through NSF's traditional CAREER development awards and a new research initiation award opportunity targeted at new biology faculty in under-resourced institutions; and mid-career faculty via the NSF-wide Mid-Career Award and Transitions to Excellence in Molecular and Cellular Biosciences programs. Dr. Soranno answered questions from AC members on several other possible directions: the need for data on post-baccalaureate student career progression; the possibility of funding professional master's degree programs; the need to support mid-career faculty at non-research-intensive institutions; possible ways to incentivize and support leadership development; and the benefits of increasing outreach to MSIs.

Joint AC Session: Directorate for Mathematical and Physical Sciences (MPS) AC and BIO AC – Dr. Joanne Tornow, BIO AD; Dr. Sean Jones, MPS AD; Dr. Carla Cáceres, BIO AC Chair; Dr. Catherine Hunt, MPS AC Chair; Dr. Ka Yee C. Lee, MPS AC Member; Dr. David B. Berkowitz, Division Director, Division of Chemistry (CHE), MPS; Dr. Theresa Good, Division Director, Division of Molecular & Cellular Biosciences (MCB), BIO

Dr. Tornow welcomed the MPS AC members and staff by outlining the goal of the session, e.g., to identify inter-directorate opportunities relevant to biotechnology, which is considered a critical enabling technology for advancing the bioeconomy. Dr. Jones expressed his excitement at the joint session. Dr. Cáceres and Dr. Hunt introduced their respective AC discussion leaders. Dr. Lee presented the findings of the report from the "MPS and the Living World" Subcommittee, whose charge focused on enabling and transforming the future of biotechnology. Among the recommendations in the report were several aimed specifically at ways that MPS and BIO could collaborate, including: a focus on big problems that require cross-disciplinary collaborative work involving scientists from MPS and BIO; accelerated dissemination of cross-disciplinary tools to the broader research community; more NSF-funded interdisciplinary research centers; and educational experiences for the next generation of biotechnologists that include cross-disciplinary training, dual mentorships, and team science, as well as mechanisms to improve diversity in the future STEM workforce. Dr. Berkowitz and Dr. Good moderated the question-and-answer session, which focused attention on the potential for continued synergy through expanded funding opportunities to support science, education, and various broadening participation partnerships among researchers from different disciplines.

BIO AC Discussion: Strategies for Synergies with MPS – Dr. Joanne Tornow, BIO AD; Dr. Karen Cone, Science Advisor, OAD; Dr. Carla Cáceres, Dr. Michael Ibba, and Dr. Thomas Daniel, BIO AC

Dr. Cáceres opened the session with a charge to the group to think about how BIO and MPS might collaborate in areas beyond those discussed in the report. As a springboard, Dr. Cone presented an

overview of how the two directorates have collaborated in the past ten years via co-funding. Drs. Ibba, Daniel, and Cáceres led the subsequent discussion to focus on the ways in which continued collaboration could advance the biological sciences and produce impactful outcomes. Discussion topics included: encouraging use of theoretical perspectives and data to inform decision-making; increasing collaboration opportunities between the Division of Environmental Biology (DEB) in BIO and the Division of Mathematical Sciences (DMS) in MPS focused on high throughput phenotyping and large datasets; supporting integration across multiple disciplines to address societal challenges, such as climate modeling; emphasizing multi-disciplinary approaches early, e.g., at the K-12 and undergraduate level, to train the future workforce; promoting broadening participation partnerships and collaboration with researchers from outside academia; and evaluating the award assessment process and metrics.

Update on new Directorate for Technology, Innovation and Partnerships (TIP) – Dr. Graciela Narcho, Senior Advisor, Office of the Director

Dr. Narcho presented the vision for TIP and how it will encourage new collaboration opportunities with other directorates to promote the mission of NSF. She noted the U.S. is faced with a pivotal moment in society, exemplified by climate change impacts and critical infrastructure failings, and how NSF can meet that moment through the intersection of foundational and use-inspired research in science and engineering and by leveraging new partnerships across sectors. TIP will be made up of existing NSF programs and new ones that complement current expertise and encourage new partnerships—all well-aligned with NSF priorities to promote innovation. Questions from the AC covered several topics, including: identifying areas of collaboration with BIO; promoting entrepreneurial programs and training opportunities inside and outside STEM; encouraging engagement with community colleges; streamlining partnership-building processes based on existing NSF-funded partnerships; and increasing outreach by TIP's Strategic Partnerships Office.

Committee on Equal Opportunities in Science and Engineering (CEOSE) Update – Dr. Suzanne Barbour, BIO AC Liaison to CEOSE

Dr. Barbour provided an update on activities from CEOSE. She noted the CEOSE mission and reminded the BIO AC that NSF investment in broadening participation has a long history. She also discussed the recommendations of current and previous biennial reports to the NSF Director and Congress. She emphasized that broadening participation is not a problem, but rather is a strategy to promote and advance scientific research, learning, and innovation, and that diverse, actionable leadership is needed to develop a more inclusive STEM workforce that is representative of all U.S. citizens. To meet these goals, CEOSE's newest report recommendations include: demonstrating and promoting bold leadership actions to create, integrate, and make visible elements within and across its programs to enhance broadening participation of underrepresented groups in STEM. Dr. Barbour answered questions from BIO AC members about measures for evaluation and accountability of program success.

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

Dr. Pataki provided an update from the AC-ERE. She discussed how the committee is working on two items: a published ad hoc report highlighting public and human health and a second report (to be published in the spring) focused on the co-production of knowledge for environmental research and

education and how NSF can support those efforts to facilitate a deep engagement of researchers with communities and stakeholders. Dr. Pataki also noted a new initiative undertaken by the AC-ERE on innovation in socio-economic and socio-environmental research. This new initiative includes conversations about how environmental equity research could be incorporated at NSF around innovation, possibly in connection with the new directorate.

Around the Table: Talking points for Director's visit – *Dr. Carla Cáceres, AC Chair*

Dr. Tornow requested the AC members consider key points and priorities from the earlier conversations for discussion with the NSF Director on the following day. Dr. Cáceres created a draft agenda that focused on future BIO engagement opportunities and assigned AC members to lead each discussion topic. AC members indicated the discussion topics of interest, which included supporting DEI in STEM with an emphasis on actionable leadership; additional collaboration opportunities between BIO and MPS beyond biotechnology and at larger scales; and continuing the discussion about how the new directorate could create prospects for training, capacity building, and synergy across all of NSF.

Dr. Tessier adjourned the meeting at 4:54 PM EDT.

Thursday, November 4, 2021

Dr. Cáceres reconvened the meeting at 10:32 AM EDT.

BIO Response to Division of Biological Infrastructure (DBI) Committee of Visitors (COV) Report – *Dr. Patricia Soranno, Division Director, DBI*

Dr. Cáceres introduced Dr. Soranno who thanked the COV for the thoroughness of the report and the recommendations therein. Dr. Daniel expressed how impressed he was with the forward-thinking response from BIO.

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

The AC reviewed the draft agenda prepared based on the previous day's last session and confirmed assignments to lead the discussion on each topic. Additional topics were suggested and finalized.

Visit with NSF Director, Dr. Sethuraman Panchanathan and Chief Operating Officer, Dr. Karen Marrongelle – *Dr. Joanne Tornow, BIO AD; Mr. Brian Stone, Chief of Staff, Office of the Director; Dr. Carla Cáceres, Dr. Suzanne Barbour, Dr. Michael Ibba, Dr. Thomas Daniel, and Dr. Robertson McClung, AC Members*

Dr. Tornow explained that Dr. Sethuraman Panchanathan was called to another meeting so was unable to attend the session. She introduced Dr. Marrongelle who expressed her gratitude to the AC for their discussion during the AC meeting. Dr. Cáceres then introduced the talking points and discussion leaders. Dr. Barbour discussed the AC's excitement for the Research and Mentoring for Post-baccalaureates in Biological Sciences (RaMP) program; she noted how the program could be used as a model to engage in partnerships with MSIs and Primarily Undergraduate Institution (PUIs) but cautioned that an assessment of the program's impact on student career progression would be critical. She also highlighted other areas

NSF might wish to consider, including: the importance of incentivizing PIs to examine and diversify research team culture; the possibility of transitioning to fully virtual NSF rotator positions in a post-pandemic world; and NSF-funded programs to support professional master's degree programs, possibly within TIP. Dr. Marrongelle agreed and added that partnering with established programs within the Directorate for Education and Human Resources (EHR) to promote broadening participation and DEI could be a valuable opportunity.

Dr. Ibba and Dr. Daniel reviewed the discussion during the joint BIO and MPS ACs session. They noted that the biotechnology focus of the MPS report could have been expanded to a wider range of applications and options, including the potential for: additional partnerships in biotechnology; further collaboration between directorates at all scales (from climate change to nanoscale); forging partnerships with institutions without wet-lab infrastructure and at all education levels, including K-12; and the development of tools and methods in collaboration with other NSF directorates, including TIP. Dr. Marrongelle noted TIP can foster partnerships in new ways with MSIs and PUIs to shape its vision and to support future infrastructure.

Dr. McClung expressed the AC's excitement for TIP and suggested that the new directorate should leverage the best practices surrounding facilitating research that has societal impact within all directorates and lowering barriers to inclusion to avoid making investments only available to the elite few. He emphasized the nontraditional award cycle of largescale partnerships and urged NSF leadership to be mindful when developing evaluation metrics. He highlighted the role that community colleges, postdoctoral students, and early- and mid-career faculty can play in meeting training and capacity building goals.

Mr. Stone thanked the AC for discussing key points that NSF leadership should work to support and communicate. A comment was made on the importance of increased outreach by NSF to PIs at MSIs and PUIs, especially during the pandemic. Dr. Marrongelle agreed and suggested the AC communicate any new outreach ideas that could meet these needs. The immense value of community colleges to prepare young scientists for broader career paths in the workforce was underscored, and a meeting with the EHR AC on this topic was suggested.

AC Summary, Future action items, Wrap-up – Dr. Joanne Tornow, BIO AD; Dr. Carla Cáceres, AC Chair

Dr. Tornow requested the AC members consider topics of interest for the next AC meeting. Dr. Cáceres noted the next AC meeting agenda will include the fourth decadal review of the Long-Term Ecological Research (LTER) program. The AC indicated they would be interested in reflecting on the MPS report from a biological sciences viewpoint, reviewing the outcomes from new programs aimed at supporting post-baccalaureate students, and discussing the workforce development taking place at community colleges. The AC reiterated its enthusiasm for meeting with ACs advising other directorates, especially on opportunities for synergy between directorates, and expressed interest in meeting with the EHR AC at some future time.

Dr. Tornow thanked AC members Dr. Diane Pataki, Dr. Lucinda McDade, Dr. Jeannine Cavender-Bares, Dr. Richard Kuhn, and Dr. Carla Cáceres for their service as they have completed their terms.

Dr. Tornow adjourned the meeting at 1:02 PM EDT.