



**Meeting of the Directorate for Education and Human Resources (EHR)
Advisory Committee
Wednesday, October 28, and Thursday, October 29, 2020
Location: Virtual**

Advisory Committee Members Present: Megan Bang, Hyman Bass, Catherine Casserly, Rory Cooper, Kaye Husbands Fealing, Okhee Lee, David Monk, James Spillane, Marilyn Strutchens (Chair)

Designated Federal Officer: Karen Marrongelle; **Executive Secretary:** Nafeesa Owens

Day 1 – October 28, 2020

1:00 PM – 5:30 PM

1:00 PM – 1:30 PM	WELCOMING REMARKS FROM THE EHR AC CHAIR & THE EHR ASSISTANT DIRECTOR
	Marilyn Strutchens , Chair, EHR Advisory Committee, & Emily R. & Gerald S. Leischuck Endowed Professor, Mildred Cheshire Fraley Distinguished Professor, Department of Curriculum and Teaching, Auburn University
	Karen Marrongelle , Assistant Director, EHR

Dr. Strutchens welcomed AC members to the virtual meeting and noted that she is looking forward to engaging in thoughtful and robust discussions over the next two days. She began the meeting with an introduction of EHR’s newest AC member, Dr. Megan Bang, Professor of Learning Science at Northwestern University, and added that two members, Dr. Rory Cooper and Dr. Catherine Casserly, would be rotating off the AC. Dr. Strutchens facilitated an introduction of all AC members to Dr. Bang. Following introductions, Dr. Strutchens provided an overview of the agenda. Meeting topics included improving STEM learning and learning environments in the pandemic; a panel on opportunities for racial equity in STEM education, enhancing broadening participation while addressing barriers to diversity, equity, and inclusion; preparing STEM education research and workforce for the future; reorganization of NSF’s Office of Legislative and Public Affairs; the NSF strategic plan; and a conversation with NSF Director Sethuraman “Panch” Panchanathan and Chief Operating Officer F. Fleming Crim.

Dr. Marrongelle provided updates since the last EHR AC Meeting. She noted that COVID-19 poses challenges and EHR has continued to work to address inequities in STEM education. Additional updates included NSF welcoming a new Director in June 2020; an upcoming

Symposium on Imagining the Future of Undergraduate Education with the National Academies of Sciences, Engineering and Medicine in November 2020; the President’s Budget increase to the EHR Core Research program; ongoing listening sessions for Mid-Scale Infrastructure for STEM Education Research; a series of workshops for STEM education for the future to prepare the field and receive feedback on the most important and emerging topics; an overview of NSF’s Industries of the Future; a discussion of NSF INCLUDES activities, such as the Report to the Nation and Planning Grants; the 20th anniversary of ADVANCE next year; and, the 30th anniversary of the Division of Human Resource Development. Dr. Marrongelle closed by noting efforts to move the needle in regards to broadening participation in STEM by acting intentionally to motivate institutional change strengthening efforts at speed and scale.

<p>1:30 PM – 2:45 PM</p>	<p>SESSION 1: IMPROVE STEM LEARNING & LEARNING ENVIRONMENTS DURING A PANDEMIC</p>
	<p>Moderator: Evan Heit, Division Director, Division of Research on Learning in Formal and Informal Settings, EHR</p> <p>Presentations and Comments: NSF Recovery Planning Task Force (RPTF) Sylvia James, Deputy Assistant Director, EHR, and Stephen Meacham, Section Head, Integrative Activities, Office of Integrative Activities, NSF</p> <p>Highlights of COVID RAPID Awards Ellen Carpenter, Program Director, Division of Undergraduate Education, EHR Robert Ochsendorf, Program Director, Division of Research on Learning in Formal and Informal Settings, EHR Claudia Rankins, Program Director, Division of Human Resource Development, EHR Daniel Denecke, Program Director, Division of Graduate Education, EHR</p> <p>EHR Post-COVID Working Group Kim Barrett, Division Director, Division of Graduate Education, EHR</p>

Dr. Evan Heit opened the session by acknowledging the ways in which the COVID-19 has impacted NSF and Principal Investigator (PI) communities. The global crisis has uncovered disparities in access and has disrupted STEM research and learning. The purpose of the session was to discuss ways to improve STEM learning and learning environments during a pandemic.

NSF Recovery Planning Task Force

Dr. Sylvia James and Dr. Stephen Meacham presented on NSF's Recovery Planning Task Force (RPTF) that focused on mitigating COVID-19 challenges that presented to PI Communities. The RPTF was interested in constructive ways that support faculty, students, and staff on campuses around the country through grants and supplements. Steve Meacham provided an overview of NSF's RAPID response to COVID-19, noting that NSF published several Dear Colleague Letters (DCL), including Dear Colleague Letter on the Coronavirus Disease 2019 (NSF 20-052) on April 3, 2020. Research funded through this DCL cuts across disciplinary silos, focusing on (1) Research Recovery and (2) Maintaining the STEM Talent Pipeline. Both areas support people and infrastructure.

Dr. James opened the floor for discussion, questions, and comments. Questions and RPTF discussion included: ensuring NSF's decisions on PI community support was rooted in empirical studies (e.g., research from the RAPID awards); concerns with learning and research loss, and the excess costs associated with maintaining scholarship rigor; concerns about the impact of the pandemic on recent graduates and scientists seeking employment, especially as it relates to adjusting processes (e.g., tenure reviews) to take into account the disruptions over which candidates have no control; and, a need to carefully track the cumulative effect of the pandemic.

Highlights of COVID RAPID Awards

Program Officers from EHR's four divisions provided an overview of COVID-19 RAPID awards. Projects addressed issues such as equity, learning loss, effects on the rural HBCU community, and effects on graduate students (focus on mental health). Examples included "*Pandemic Learning Loss in U.S. High Schools: A National Examination of Student Experiences*" (DRL 2030436), "*Addressing Equity when STEM Teaching and Learning Go Remote*" (DUE 2029642), "*Graduate Student Experiences: Support and Stress During the COVID-19 Pandemic*" (DGE 2030313), and "*Effects of the Move to Online Teaching on the Rural HBCU Community due to the Coronavirus (COVID-19) Pandemic*" (HRD 2028573).

EHR Post-COVID Working Group

Dr. Kim Barrett provided an overview of the Post-COVID Working Group to date, including its charge, landscape, and assumptions. The group reviewed crisis as opportunity, outlined priorities, and made major recommendations. Two urgent priorities

were to (1) swiftly preserve, reinforce, and build new pathways to STEM and STEM education careers, and (2) take bold steps to promote education that designs, tests, and validates new modalities of educational delivery. Examples of outcomes that resulted from the group’s recommendations include awards that address pathways and processes for graduate students (e.g., DGE 2030148 and HRD 2028811), and award supplements to enable PIs to continue program efforts in the Historically Black Colleges and Universities Undergraduate Program (HBCU-UP) and the Tribal Colleges and Universities Program (TCUP). The working group asked AC members to provide additional feedback and comment on the broad priorities identified, specifically noting if important research areas were missing.

Dr. Barrett opened the floor for discussion, questions, and comments. Questions and Post-COVID Working Group discussion included: ensuring funding in the form of supplements for students to finish their degrees; transforming the long-standing and currently amplified tension between schools, educators, and communities into an opportunity; a discussion that class as a key issue in inequities and that addressing challenges must involve building diverse coalitions; and that the home must be a more enriched and empowered environment for the well-being of children and families.

2:45 PM –3:00 PM BREAK

3:00 PM – 4:00 PM	SESSION 2: OPPORTUNITIES FOR RACIAL EQUITY IN STEM EDUCATION PANEL
	<p>Moderator (and Panelist): Marilyn Strutchens, Chair, EHR Advisory Committee</p> <p>Panelists:</p> <p>Melissa Collins, 2nd Grade Teacher, John P. Freeman Optional School</p> <p>Juan Gilbert, Andrew Banks Family Preeminence Endowed Professor and Chair of the Computer & Information Science & Engineering Department, University of Florida</p> <p>Christopher Jett, Associate Professor of Mathematics Education, Department of Mathematics, University of West Georgia</p>

AC Chair Marilyn Strutchens opened the session and introduced the panelists. Panelists were

asked to speak to three questions that focused on broadening participation and racial equity in STEM.

Question 1: *What changes do you believe need to happen to reduce the barriers experienced by African Americans, Latinx, and Native Americans in STEM?*

- Panelists emphasized the importance of: a strong foundation in STEM beginning in early foundational years; mentorship and role models; exploring real-world problems and tying STEM concepts to industry with practical ways students can help their communities; supporting and developing educators through mentorship and training; developing better marketing mechanisms to recruit and retain students in pathways that lead to STEM; and developing assessments that enable educators to make better inferences about student knowledge and abilities.

Question 2: *What exemplars/models in STEM have worked well to reduce barriers to diversity, equity, and inclusion?*

- Panelists highlighted the following exemplars/models in STEM:
 - o University of Florida – At the graduate level, UF had the largest number of Black faculty in computer science (5 faculty), and the nation’s largest number of Black PhD students, the majority of whom were women. UF created a model that identified barriers to persistence and broke them down. This model was successfully replicated at Clemson and Auburn Universities.
 - o Meyerhoff Scholars Program at University of Maryland Baltimore– Mentoring, tutoring, and parent engagement promote a sense of community increasing persistence in STEM.
 - o Facilitating Academic Careers in Engineering and Science (FACES) Program at Georgia Tech (in partnership with Emory, Morehouse and Spelman) produced over 300 doctorates in STEM.
 - o White Coats for Black Lives, a medical student-run organization, showcases contemporary doctors and their achievements demonstrating how to be an activist in relation to STEM work.
 - o MPLOY Program in Memphis- a locally funded initiative, administered by Memphis Office of Youth Services, provides City of Memphis youth ages 14 to 22 with meaningful summer experiences. The MPLOY Youth Summer Experience offers various career path options (including STEM) according to students’ strengths and interests, including soft skills training, entry-level positions, and internships. The program works with 600-700 students annually. Students who participated in previous years could return to share experiences in STEM with younger students.
 - o Skype with a Scientist, a free platform that allows people to request a scientist to conduct hands-on experiments and activities virtually. The platform showcases

how teachers have come together globally to create STEM activities and share STEM experiences.

- Panelists added the importance to considering models outside of STEM, as they may have transferable components to STEM. It was also noted that successful models must help students develop a growth mindset about STEM.

Question 3: *What can NSF and EHR do to make meaningful changes in broadening participation?*

- Panelists noted both short- and long-term ways in which NSF and EHR can make meaningful changes. Suggestions included: hosting a broadening participation discussion and professional development series nationally or regionally; revisiting and re-imagining NSF centers and making operational changes in support of broadening participation; connecting and establishing more centers focused on broadening participation; continuing to fund NSF INCLUDES and similar initiatives; providing and supporting mentoring programs for children of color; funding programs focused on changing school systems and ensuring that funds are being directed correctly and applied to children of color; funding programs focused on recruitment and retention of students from underrepresented groups; encouraging partnerships between Minority-Serving Institutions and primarily White institutions; developing marketing campaigns directed at recruitment for STEM fields; and examine institutions that have been successful in recruiting, retaining, and advancing students into STEM.
- A panelist noted, “Broadening participation is not rocket science. It’s harder.” This is a generational issue that is not easily changed. As such, broadening participation must be treated in the same way as any other complicated scientific problem.

Marilyn Strutchens opened the floor for discussion, questions, and comments. AC members thanked the panel for their insight and expressed agreement with the many issues, topics, and themes raised. Questions and discussion included best practices for student recruitment into STEM programs; leveraging family assets and resources to help change structures and educating families about STEM careers; facilitating intentional outreach about graduate schools and programs to first generation students; and designing STEM programs for belonging and meaningful connection.

4:00 PM –4:15 PM BREAK

4:15 PM – 5:30 PM	SESSION 3: ENHANCE BROADENING PARTICIPATION WHILE
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	ADDRESSING BARRIERS TO DIVERSITY, EQUITY, AND INCLUSION
	<p>Moderator: Diana Elder, Division Director, Division of Human Resource Development, EHR</p> <p>Presentations and Comments: NSF INCLUDES, Sylvia James, Deputy Assistant Director, EHR</p> <p>Broadening Participation (BP) Subcommittee, Okhee Lee, Professor, Steinhardt School of Culture, Education, and Human Development, New York University; BP Subcommittee Chair; and EHR AC Member</p>

Dr. Elder provided an introduction reflecting on the concepts of “Daylight, Inspiration, Opportunity, and Challenge”. She highlighted current societal challenges that inspired philanthropy such as the recent \$80 million dollar gift to two Historically Black Colleges and Universities (HBCUs) prompting those working in federal policy to seize the opportunity to effect change through their work and deploy their knowledge quickly.

NSF INCLUDES

Dr. James thanked the earlier panel for their reference to NSF INCLUDES and their plea for NSF to continue funding systemic change efforts. She proceeded to highlight NSF INCLUDES current activities, events, and funding opportunities. Highlights included an overview of the NSF INCLUDES Report to the Nation II, released in July 2020; the announcement of winners of the STEM DIVE (Diversity and Inclusion Video Exhibition) Challenge, which showcased how forging partnerships, networks, and alliances have contributed to broadening participation in STEM; NSF INCLUDES recent funding opportunities – Planning Grants (NSF 19-600) and Alliances (NSF 20-569); the NSF INCLUDES Coordination Hub activity updates, including Shared Measures system and framework; and, federal agency partner collaborations with NSF INCLUDES such as the NASA MUREP INCLUDES Planning Grants. As a final note, Dr. James introduced the new NSF INCLUDES Implementation Team co-leads. Dr. Tori Rhoulac Smith (new EHR Co-Lead) and Dr. Lina Patino (interim GEO Co-Lead).

In the interest of time, all questions were held until the end of the session.

Broadening Participation (BP) Subcommittee

Dr. Lee provided an introduction to the Broadening Participation (BP) Subcommittee charged with developing metrics for monitoring progress using two public documents as a framework: NSF-funded workshop report *Monitoring Metrics for Programs focused on BP* (Clewell & Fortenberry, 2009) and the Committee on STEM Education (CoSTEM) report *Chartering a Course for Success: America’s Strategy for STEM Education* (NSTC, 2018). Dr. Lee thanked Dr. Sandra Richardson, Executive Secretary to the Subcommittee and Program Director in the

Division of Undergraduate Education, for her commitment to the project and her willingness to meet weekly. She also acknowledged Sarah-Kay McDonald, Bernice Anderson, and Jack Butler for their assistance, especially with data analysis. Thanks were also extended to Diana Elder, NSF Liaison to the Subcommittee and Division Director of the Division of Human Resource Development, as well as to Subcommittee members Marilyn Strutchens and Rory Cooper.

Dr. Lee provided an update on the progress of the subcommittee work and its ambitious timeline. The subcommittee plans to complete their report by Spring 2021. Thus far, the subcommittee worked to: clarify and define appropriate terminology; address the deficit undertone associated with the term “underrepresented minority”; define monitoring metrics vs. indicators; and defined monitoring vs. evaluation. The subcommittee used the Faculty Early Career Development Program (CAREER) as a prototype to understand the impact of the CAREER award on: (1) scholars from underrepresented groups in the academic profession; and (2) capacity-building for STEM education research. Using the EHR data from CAREER, the potential for developing monitoring metrics to serve as a prototype for NSF and other federal agencies had become clearer.

Dr. Lee provided a report outline that included an introduction situated in context of COVID-19 and systemic racism, followed by a Vision and a Purpose that framed the report in the context of ongoing EHR initiatives and priorities. Dr. Lee explained that results would be divided into three main areas:

1. Who are EHR CAREER PIs in terms of demographic subgroups?
2. What is the EHR CAREER PI’s productivity in terms of NSF Awards, submitted and received?
3. What is the EHR CAREER PI’s productivity in terms of publications?

With respect to next steps, the subcommittee planned to gather data for Area 3, productivity in terms of publications. Members would complete the findings, recommendations, and closing sections of report; submit report for internal review; share the final report with the AC by May 2021; and disseminate findings and recommendations upon completion.

Dr. Lee opened the floor for discussion, prompting EHR AC Members to think about next steps and provide input on whether the subcommittee should create a dashboard, investigate belonging, or publish stories. Questions and comments posed to Dr. Lee and Dr. Richardson focused on further details about the CAREER study, including clarifications about funding rate, comparing the demographics of awards vs. declines, a discussion around why EHR receives fewer proposals per year than other directorates and programs, and award rate for resubmissions.

DAY 1 END

Day 2 – October 29, 2020

1:00 PM – 5:30 PM

1:00 PM – 2:00 PM	SESSION 4: PREPARING FOR THE FUTURE: STEM EDUCATION RESEARCH AND WORKFORCE
	<p>Moderator: Robin Wright, Division Director, Division of Undergraduate Education, EHR</p> <p>Breakout Facilitators: Robin Wright, Division Director, Division of Undergraduate Education, EHR Lee Zia, Deputy Division Director, Division of Undergraduate Education, EHR Sarah-Kay McDonald, Senior Advisor, EHR</p>

Dr. Karen Marrongelle welcomed attendees and invited reflections on the discussions of the first day’s meeting sessions. Once all members were present, Dr. Marilyn Strutchens introduced the session moderator, Dr. Robin Wright, the Division Director of NSF’s Division of Undergraduate Education. Dr. Wright greeted the AC and recalled Dr. Gilbert’s words from the previous day’s meeting regarding the Advisory Committee’s role in providing advice to the Directorate. She asked the AC for their continued discussion and input on the topic of preparing for the future of STEM education. Dr. Wright recalled a report from the AC subcommittee on STEM education of the future, and commended the foresight of the report, which was written prior to the COVID-19 public health emergency in the US. Dr. Wright highlighted the prominence of diversity, equity, and inclusion (DEI) as key principles of EHR decisions and the importance of evidence-based practices for engaging students within that framework. Dr. Wright envisioned an educational framework with multiple on- and off-ramps for learners throughout their lifetimes and invited the AC members to identify key problems for which EHR has not made the progress expected or desired towards their resolution, and to propose actions and measures to better prepare for the future of education.

Dr. Wright introduced Dr. Lee Zia, the Deputy Division Director for the Division of Undergraduate Education, as her fellow breakout moderator, and dismissed the members of the AC to their respective breakout groups.

Both breakout rooms invited AC members to annotate a shared slide as they considered how EHR could spend a surplus of funds in addressing key issues in STEM education. AC members were asked: *“What understandings and discoveries about STEM education do we need so that the nation can:”* either *“Solve pesky, persistent problems in STEM education”* or *“Achieve the vision for STEM Education of the Future”*.

Breakout Room 1 – Dr. Lee Zia facilitating**AC Members:** David Monk, Okhee Lee, James Spillane, Catherine Casserly

Dr. Casserly reported out for the first breakout room and began by thanking Dr. Zia for moderating the discussion. Dr. Casserly described the group's discussion of diversity, equity, and inclusion as a core issue and the intentions raised towards improving the issue. They noted a dearth and fragmentation of support for STEM in educational systems, and that decision making in these systems is often hierarchical and made at high levels, rather than with learners at the center of decision making. The group wants to empower students and teachers in the core infrastructure of STEM education. The group noted the prevalence of deficit models and encouraged a look at structural and contextual supports to develop new models and new results. Group 1 members noted that the COVID-19 pandemic accelerated integration of technologies into education that made education more community-oriented. However, deficit models are prevalent. There is a need to review structural and contextual supports to create new models and new results. In summary, breakout room 1 urged shifts in systems of longstanding institutions to a distributed remote learning and a shift toward more integrated domains of learning that balances the importance of domain knowledge and the interconnectivity of domains in broad issues.

Breakout Room 2 – Dr. Robin Wright facilitating**AC Members:** Marilyn Strutchens, Hyman Bass, Rory Cooper, Megan Bang

Dr. Strutchens reported out for the second breakout room, noting the group's emphasis on community engagement and learning experiences beyond traditional classrooms. She also maintained the need to increase the number of qualified STEM teachers in high-needs schools, which is crucial to increase access for students to higher STEM education. She posed to the Committee the question of what incentives and programs can be created to increase the number of qualified STEM teachers and the rate at which they remain teaching in high-needs schools. The group highlighted the need for research on creating experiences with an emphasis on accessibility for both remote operation and participation. Dr. Bass raised the issue of promoting asset-based teaching and encouraged thinking around how to recognize and promote equitable instruction. He stressed the need for ample observation of teacher response to student error and how student thinking and knowledge-building can be harnessed and encouraged to stimulate learning.

Dr. Wright concluded by inviting the Committee members to consider how to transfer existing knowledge of what ought to be done to address problems in education to practice at scale and at speed, and whether more research is needed on these implementation strategies.

AC members discussed that beyond recognizing equitable instruction, there is a need to conduct further research to appropriately characterize equitable instruction and help teachers acquire the requisite skills. Another discussion raised the issue that applying research at scale requires implementation across many different systems and structures that are frequently overlapping, and that jurisdiction for implementing practices is not always clear-cut. A member pointed out that defining a vision and reaching a consensus on that vision are only first steps. Another member posed the question of where issues of educational research blend into issues of political action and influence, noting that national educational standards are often highly politicized, and significant political obstacles exist to producing uniform standards. Members acknowledged the importance of political capital in implementation and stressed the importance of EHR as a leader in creating systems that can support a vision for future education.

2:00 PM –2:15 PM BREAK

2:15 PM – 3:30 PM	SESSION 5: THE FUTURE OF NSF
	<p>Moderator: Sarah-Kay McDonald, Senior Advisor, EHR</p> <p>Presentations: Office of Legislative and Public Affairs Reorganization, Amanda Greenwell, Head, Office of Legislative and Public Affairs, NSF NSF Strategic Plan, Sylvia James, Deputy Assistant Director, EHR</p>

Dr. Sarah-Kay McDonald began the session by noting that the presentations shift focus from EHR to the Foundation as a whole and, while session title implies focus on the future, the session is a mix of the present (first presentation) and the future (second presentation).

Office of Legislative and Public Affairs Reorganization

Amanda Greenwell provided an overview of the Office of Legislative and Public Affairs (OLPA), including its role within the Foundation and recent initiatives. The role of OLPA is to strategically communicate the value of the science that NSF supports to stakeholders and to the public. As the communications landscape is constantly evolving, OLPA must adapt content and communications in the short and long term (e.g., response to the ongoing pandemic). OLPA reorganized and established new branches to work together more effectively, and to better support and amplify the work done by the agency and research community. Changes included:

the Congressional Affairs team has been renamed Government Affairs to reflect the expanded mission; and, the Creative Services team is brand new and works on NSF's digital strategy. Recent initiatives and activities included: NSF's 70th anniversary symposium, hosted in February 2020 and efforts to continue this celebration throughout the year through the "[I am an NSF story](#)" campaign; NSF named as one of the Top 10 Instagram accounts in the Federal Government; NSF's reimagined blog, [Science Matters](#), which recently highlighted NSF-supported STEM education resources relevant to the current virtual learning environment; NSF activities on the Hill through a series of planned thematic outreach and education events (e.g., "The Quantum Future"), which were adapted to be virtual; and, an update on a recently produced report for Congress that detailed how NSF mobilized funding to support research and activities that address the current COVID-19 pandemic. Amanda highlighted the success surrounding the first image of the sun produced by NSF's Daniel K. Inouye Solar Telescope (DKIST) and the outreach strategy, which led to major media coverage (CNN, NY Times) and even spawned memes that increased the reach of the message and broadened engagement with the public. In closing, Amanda provided various channels through which AC members and the public could reach out to OLPA.

NSF Strategic Plan

Dr. James provided updates about NSF's work around its strategic plan. NSF solicited input from Advisory Committees as they develop 2022-2026 Strategic Plans. This plan will be replacing the current strategic plan (2018-2022, available as [NSF18045](#)), which AC members may want to reference to get a sense of the key elements. An initial draft will be shared with Congress in early June 2022) with the final plan to be published in February 2022. AC members may provide feedback individually or as a group (e.g., in the form of an AC white paper). Feedback in the form of individual responses may be provided at the following link: <https://www.nsf.gov/od/oia/strategicplan/feedback.jsp>. An AC White Paper may be emailed to StrategicPlan@nsf.gov. The key elements to focus on and address include NSF's vision, core values, strategic goals, and strategic objectives. An invitation for the research community and general public to provide feedback will go out by the end of the calendar year. Mechanisms for NSF staff to provide feedback were also shared.

Before opening the floor for discussion, Dr. McDonald asked for clarification regarding the window of time during which AC members could provide feedback on the strategic plan. Dr. James noted that it would be ideal to provide feedback by the end of this calendar year, as feedback from the public will be solicited at the end of the year. AC members would likely have until the beginning of the next quarter (January or February 2021) to provide feedback.

Dr. McDonald opened the floor for discussion, questions, and comments, prompting AC members to consider the following questions:

(1) What are the interests, values and emergent science and policy issues that the Strategic Plan should recognize? (2) How can NSF help maintain U.S. leadership in an evolving global research and education landscape? (3) How can the plan best underscore the importance to the Nation of fundamental research and its broader impacts? (4) What elements of the current plan, if any, are no longer relevant?

With respect to question (1), members noted that the plan should continue to emphasize: equitable access to quality STEM learning and teaching; broadening participation in STEM generally and within criteria for proposals; research on models of learning beyond the classroom; as well as the role of technology in STEM education. With respect to question (2), members noted the extent to which international students and researchers play in helping maintain U.S. leadership, and that immigration policy and the way in which it impacts U.S. leadership in STEM, albeit challenging, is an issue to consider for the strategic plan. With respect to question (3), members discussed: telling stories that demonstrate the research process and how it progresses over time vs. shorter-term studies where results are more readily available; conducting case studies with CAREER awardees to highlight both internally within the CAREER community and the external public how receiving funding has impacted their research productivity; and helping researchers and scholars to get funding to think more broadly about communicating their research to policymakers and the public. During the discussion, David Monk spoke about the gaps between NSF and state and local education organizations, and how NSF-funded work could help with outreach at that level. Dr. Monk noted that there was a genuine interest in evidence, but it was often communicated in an opaque manner. It would be fruitful if NSF could help build lines of communication in this area.

<p>3:30 PM – 3:45 PM</p>	<p>PREPARE TO MEET NSF DIRECTOR SETHURAMAN “PANCH” PANCHANATHAN AND CHIEF OPERATING OFFICER F. FLEMING CRIM Moderator: Marilyn Strutchens, Chair, EHR Advisory Committee</p>
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AC members suggested questions and topics for which the AC would like insight into from NSF Director, Sethuraman “Panch” Panchanathan, and Chief Operating Officer (COO), Fleming Crim. Topics included: major challenges facing the agency currently, particularly as they relate to EHR and its landscape; strengths and opportunities that the Director sees for NSF; partnerships; perspective about the PreK-12 teacher workforce, particularly as related to diversification; and NSF’s plans to support students with disabilities, particularly those at the K-12 level.

3:45 PM –4:00 PM BREAK

<p>4:00 PM – 5:00 PM</p>	<p>TALK WITH NSF DIRECTOR SETHURAMAN “PANCH” PANCHANATHAN AND CHIEF OPERATING OFFICER F. FLEMING CRIM Moderator: Marilyn Strutchens, Chair, EHR Advisory Committee</p>
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Dr. Strutchens opened the session and asked AC members to introduced themselves. NSF Director, Dr. Sethuraman “Panch” Panchanathan, presented his guiding vision and strategy for NSF’s – strengthening at speed and scale. The presentation addressed the three pillars in NSF’s mission statement, as well as three additional pillars for strengthening NSF’s position and innovation: advancing research frontiers; ensuring accessibility and inclusivity; and securing global leadership.

Dr. Panchanathan emphasized that NSF must lead by values and by conducting quality research with integrity. Likewise, innovation must permeate both internal actions of NSF and what the agency supports externally. The Director’s vision also focused on addressing the “missing millions” – the talented individuals that have been historically left behind due to a lack of available opportunity. First and foremost, NSF must focus on cultivating domestic talent to bridge the gap of the missing/invisible millions. Finally, in order to strengthen scale and speed for NSF’s education and innovation investments and outcomes, NSF must focus on partnerships, people, and translation to empower communities and expand participation.

Dr. Strutchens opened the floor for discussion, questions, and comments. AC members thanked Dr. Panchanathan for sharing his vision and asked what he believed the major challenge was that NSF faces, and which challenges EHR will face in implementing and realizing this vision. Dr. Panchanathan shared that the greatest challenge was that of the missing millions who are not part of the STEM enterprise currently. NSF will, can, and must do a lot, but it alone cannot become the solution. NSF must work in partnership (bilaterally and multilaterally) with other agencies, organizations, and companies.

Other questions from the AC members to Dr. Panchanathan included: the infrastructure and configuration of expertise at NSF that can most effectively address multiple crises happening in our country at once; NSF’s plans to help students with disabilities learn STEM, especially with the challenges with COVID-19; how NSF can ensure creating a PreK-12 teaching workforce aligned with the Director’s vision; and how could STEM disciplines harness COVID-19 as an opportunity to make science a relevant and integral part of everyday life. Dr. Panchanathan shared that to address multiple crises in our country, NSF must configure programs and project to mirror and catalyze the scientific community. The agency must work together with other

government agencies through various mechanisms, including interagency working groups to address the nation’s greatest challenges. With respect to supporting students with disabilities, Dr. Panchanathan spoke about the importance of technology to create more inclusive STEM pathways for people with disabilities. He underscored that this was a focus area that must be accelerated via partnerships with industry. With respect to the question about the PreK-12 teaching workforce, Dr. Panchanathan maintained the importance of inspiring, nurturing, and encouraging teacher trainees, and noted that the quality of teaching in rural areas must be improved. The Director closed by noting that in order to harness the opportunity of COVID-19 to make science relevant, we must adopt a societally- and solution-oriented mindset. This must involve convergent learning within and across different disciplines to solve problems. NSF can inspire and catalyze this type of mindset.

Dr. Panchanathan thanked the committee for its time and guidance provided to EHR.

5:00 PM – 5:30 PM	CLOSING REMARKS
	<p>Karen Marrongelle, Assistant Director, EHR Marilyn Strutchens, Chair, EHR Advisory Committee, & Emily R. & Gerald S. Leischuck Endowed Professor, Mildred Cheshire Fraley Distinguished Professor, Department of Curriculum and Teaching, Auburn University</p>

Dr. Karen Marrongelle and Dr. Marilyn Strutchens thanked all AC members for their valuable input and time. Dr. Marrongelle made several announcements. The CoSTEM Request for Information on STEM Education was extended until November 20. Francisco Rodriguez, the former AC Chair, was recently appointed to serve on the STEM Education Advisory Panel. Prior to adjourning, Dr. Marrongelle and Dr. Strutchens thanked Rory Cooper and Catherine Casserly for their service, as they are rotating off the AC. Dr. Marrongelle noted that Dr. Cooper’s and Dr. Casserly’s advice and perspectives have been instrumental in assessing long-term strategic planning for EHR.

Dr. Marrongelle thanked all EHR staff who helped the meeting come to fruition and reminded AC members that the next meeting would be May 26-27, 2021. Dr. Marylin Strutchens thanked all members for their contributions to a productive discussion and adjourned the meeting at 5:25 p.m.