

EHR¹ ADVISORY COMMITTEE MEETING MINUTES

May 31 and June 1, 2022

On May 31, 2023, Marilyn Strutchens, chair of the EHR Advisory Committee, welcomed everyone to the AC meeting and noted that we had eight new members joining the AC, and that they had already been off to a great start, including participating in an orientation workshop with EDU Leadership. Some new members had even started to jump into work through their efforts on the Subcommittee on Partnerships which was slated to be discussed on day 2. Dr. Strutchens then asked the AC members to introduce themselves.

After the introductions, the AC approved the minutes from the previous meeting. Next Dr. Strutchens gave a presentation focused on the theme ***Expanding Opportunities in STEM: An American Imperative***. She shared several calls for a focus on increasing the number of students in pathways leading to STEM careers.

Dr. James Moore, Assistant Director for the Directorate of STEM Education, welcomed the AC and provided an overview of recent accomplishments across the directorate.

Opening Presentation: *Institutional Habitus: Breaking the Status Quo*

Dr. Erin Lynch presenting her research and findings regarding institutional habitus within Science, Technology, Engineering, and Mathematics (STEM) education. Her work focused on why certain behaviors and attitudes are often perpetuated in educational institutions and how professionals in the field can begin to change these habits.

Dr. Lynch highlighted the importance of creating student-centered learning environments that are representative of all students and helps to ensure positive identity development for students and communities. There must be collective conversations in this arena between classroom teachers, teacher's associations, policy boards, and researchers or positive change cannot happen.

Dr. Lynch provided several recommendations for how researchers and practitioners can begin creating these environments and dismantling the implicit and interiorized behaviors and values that hold back growth within educational institutions. These recommendations included evaluating personal concept, prototypes, stereotypes, and scripts; addressing current cognitive schemas prominent in the institution; focusing on science management; and assessing institutional policies for where change is needed.

Session 1: *Expanding Understanding of Knowledge Capital (Breakout Sessions report out June 1, 2023)*

AC Member Kaye Husbands Fealing, presentation *Launching the Science of Science*

¹ Note: The Directorate for STEM Education's Advisory Committee is still going under the name of EHR because of FACA requirements. Specifically, EHR AC cannot change its name to EDU AC until the COVs and Subcommittee started under EHR have concluded. The name change is expected to take place at the end of June 2023.

Dr. Husbands Fealing's stated that the early (2006) Science of Science initiatives came about in connection with NSF building an evidentiary case for building participation in STEM. That led to the Science of Science team developing knowledge theories related to science metrics. In the end, they found that the most important element was to have an understanding of *who* is doing the work. She stated that despite Science of Science's focus on measurements, the primary focus and foundation is still the development of *people*.

Dr. Husbands Fealing presented nine "grand challenges." Among those, she encouraged people to think about how to measure important intangibles, not just what can be seen. She reminded listeners to remember that the core reason behind promotion of science is social well-being. She strongly emphasized the importance of qualitative storytelling, often overlooked in favor of quantitative measures. She also shared a quote from another AC member: "Broadening participation is not a problem but [instead] a strategy..." Dr. Husbands Fealing said that regarding impact measures, she really wanted to emphasize how important it is to understand what problem we're trying to solve and for whom.

Session 2: Expanding Partnerships: Directorate for STEM Education (EDU) and Directorate for Technology, Innovation, and Partnership Discussion

This session focuses on the partnerships with EDU and the new Directorate for Technology, Innovation and Partnerships (TIP). James and Erwin discussed how EDU and TIP's missions overlap, especially with regards to workforce development. Both directorates benefitted most from the CHIPS and Science Act and prioritize translating technology to practice, creating opportunities everywhere, and promoting innovation. TIP and EDU's focus on workforce development is a tremendous opportunity to bring in the missing millions, specifically non-academics who are not NSF's traditional community.

The AC committee asked about how NSF is coordinating with existing hubs, so that new Hubs created by the CHIPS act don't duplicate efforts. The White House is coordinating engagement across agencies through several workforce committees, which facilitate a clear understanding of overlapping work. James and Erwin frequently communicate with the Department of Commerce about Hub programs.

The AC committee asked how EDU is navigating power dynamics between institutions partnering for regional work, like Mississippi College and Jackson State, when there are differences in resources? Additionally, how can institutional partnerships be sustainable? EDU and TIP recruit reviewers that reflect the diversity of institutions so they can reflect on partnership dynamics outlined in proposals. Some programs facilitate building capacity measures, like institutional coaching and mentoring.

Session 3: Expanding Outreach and Engagement: Centers, Hubs, and Alliances

This session included presentations from Principal Investigators for Centers, Hubs, or Alliances and included the following.

- **Yael Perez** is a Program Director for the Native FEWS Alliance at University of California, Berkeley, on the NSF INCLUDES Alliance: Broadening Career Pathways in Food, Energy, and Water Systems with and within Native American Communities grant. This project is funded through the

NSF Eddie Bernie Johnson INCLUDES Network and funded through two separate awards, (P2120035, PI Karletta Agogino and P2120001, PI Alice Agogino).

- **Danielle Ferguson** is a Senior Qualitative Researcher at the American Institutes for Research. She serves as a Co-PI on the NSF ECR Hub: Advancing the Long-Term Potential of Fundamental STEM Education Research (P2208422).
- **Jeremy Rochelle** Principal Investigator of the NSF: Center for Integrative Research in Computing and Learning Sciences (CIRCLS) (P2021159), shared on how the resource center connects expertise and broadens impacts.
- **Charlene Mickens Duke**, a Co-Principal Investigator, presented on the NSF ATE grant “Community College Presidents Initiative – STEM – Achieving Excellence in Workforce Education (ccpi-stem.org)” (P2132510).

The AC reflected on the presentations and provided positive feedback on the asset-oriented nature that presenters had surrounding their partners and ways in which they make their expertise visible.

The AC recommended engaging in work to disrupt silos across directorates around broadening participation and engaging resource centers more in broadening participation, as well as connecting resource centers more with one another.

The AC also recommended taking a more intentional strategy to hiring staff with a wide range of STEM disciplinary expertise by engaging strategically with other directorates.

NSF EDU representatives noted the importance of improving communications from NSF on all the cross-directorate work that is being done and the ways in which resource centers network with one another.

The AC also discussed difficulties in translating NSF terminology to external stakeholders and recommended providing more clarity surrounding definitions and differences between alliances, hubs, and centers.

Session 4: Committee of Visitors Reports for both the Division of Undergraduate Education and Division of Graduate Education

Robust discussions occurred regarding the DGE and DUE COV reports that yielded the following points:

There were no follow-up questions generated after the DUE COV report. With regard to DGE, the focus was on GRFP, with recommendations that included outreach to encourage MSIs and HBCUs to begin developing and preparing students as undergraduates to increase accessibility of the GRFP awarding mechanism. GRFP may consider harnessing QEM and other organizations to host GRFP proposal development workshops to increase the diversity of the applicants and consequently awardees.

One member inquired on the DGE COV recommendation to see NRT grow to increase the programs award success rate. Clarity was offered in that the COV report shares that to increase the program success rate as well as to increase the level of NRT funding.

The AC felt a new policy was needed to leverage recommendations made within the DGE COV report.

The AC moved to accept both COV reports, and the vote passed unanimously.

Session 5: *Expanding Understanding of Knowledge Capital: AC Comments and Recommendations*

AC members were divided into three groups during Day 1 of the meeting. In this session on the morning of Day 2, each group provided a report out of the questions members would like to see addressed to expand our understanding of knowledge capital programs.

Members suggested topic-focused questions such as how does EDU develop and advance knowledge on (a) broadening participation, (b) the science of teaching, (c) how community colleges feed into students' STEM pathways, (d) how partnerships are formed across institutions, (e) why enrollment and graduation rates are low, (f) how to mobilize knowledge to inform policy, among other questions.

Members discussed approaches to employ in common across programs such as thinking about the audience and political climate when planning to tell the story and collecting narratives of lessons learned across settings as well as disaggregated by the diversity of institutions and individuals.

Members discussed how the alignment across program, division, directorate, and agency allows for framing and telling a story that might include how EDU is helping other Directorates achieve their missions.

Members were in consensus that EDU should be ahead of telling the story before any negative press about award investments. EDU needs to have good answers to what is the return on investment and if we can identify what EDU's moonshot is and how to get there.

Another suggestion was to focus on stories that notice who is being uplifted, especially for those that have not been given the same opportunities. Methods to tell these stories could be qualitative or mixed method in nature.

Session 6: *Expanding Outreach and Engagement: Targeted Initiatives*

This session focuses on targeted initiatives and opportunities which are specific to this moment in time. We selected each of these initiatives for their support of broader participation in STEM: Expanding the rate at which Hispanics earn PhDs in STEM Disciplines; A suite of strategies for reaching the missing millions; and Revisioning the geographic approach of the EPSCoR Program for strengthening research competitiveness. These three initiatives are not the only areas of focus for EDU, but they provide a means for us to capture your thoughts on EDU's ongoing efforts to broaden participation in STEM.

There are two ideas from our discussions yesterday that are germane to this morning's conversation:

- 1) Effective work in broadening STEM participation must start with people, and more precisely, with the mindsets of people, so that the work we do is centered around the voices of the community we are striving to serve (expression of this idea in the AC meeting is attributed to Dr. Lynch.
- 2) Broadening participation is not a problem to solve, but a strategy to employ for strengthening a STEM ecosystem that produces innovation and transformative problem-solving (expression of this idea attributed to Dr. Husbands-Fealing.

A few key takeaways from the Hispanic STEM Student discussion

- (1) *Rapid growth of HSIs.* The number of HSIs has tripled over the last 25 years.

- (2) *HSIs prepare the majority of Hispanic students.* HSIs represent 19% of colleges and universities and enroll 62% of all Hispanic undergraduates in higher education.
- (3) *PWIs play a significant role in graduating Hispanic STEM Ph.D.'s.* Of the top 20 Hispanic Ph.D. graduates in STEM, 15 are Predominately White Universities (PWIs), 5 are emerging HSIs (15% - 24% Hispanic enrollment), and 2 are HSIs.
- (4) *Four Primary Challenge Themes.* Both the literature review and the listening sessions revealed several challenges, which can be grouped into four areas:
 - a. Access and Pipeline (ecosystem)
 - b. Recruitment
 - c. Retention and support
 - d. Department and University Culture

During the larger discussion, a significant focus was placed upon institutional infrastructure as they relate to NSF portfolios, there may be two parts for NSF to consider including Institutional ability to apply for funds, (i.e., grants office) and access to information about grants in post-pandemic scenario, (i.e., NSF to remarket grants to “build back education system.”)

There was discussion on leveraging partnerships with local/regional stakeholders including operationalizing partnerships through the development of a framework. There was interest in hubs specifically as ways to help regional stakeholders connect to each other. EPSCoR regional partnerships connecting private philanthropists with regional interests was discussed, as was connecting stakeholders’ organizational mission statements tied to regional economic development (i.e., labs, universities) with solicitations. The AC identifies ways in which directorate/foundation can strengthen local partnerships through hubs, and to operationalize organizational culture.

The AC noted that NSF needs to be creative to support underserved institutions to apply to complicated grants. Workshops alone don’t solve the issues for institutions that don’t have staff capacity or a grant office. Considerations about differences in organizations that apply to EDU may facilitate broadening participation, (i.e., sociopolitical context of the state, types of institutions). The AC recommended identifying specific ways in which the directorate supports underserved institutions.

Session 7: Expanding Partnerships: Direct Partnership Guidance

During the opening moments of the AC subcommittee meeting on leveraging partnerships to reach the Missing Millions, Dr. Anne Marie Nunez provided a walkthrough of the most recent report from the subcommittee.

There was a discussion about organizational cultures and differences that could influence the health and success of specific partnerships. Overall, it was agreed that NSF can’t predict the work styles of partnerships and how they relate to NSF. However, the core values of partnerships should align with that of NSF’s. Because engaging in partnerships takes a lot of time to build these partnerships, we should lean into and learn from others that are doing it successfully already.

Other things that people thought to consider were: partnerships for capacity building and infrastructure support, the political challenges of partnerships when shifts in political parties can end up influencing or shutting down different partnerships, equitable partnership acquisition, what is considered a long-term partnership,

Discussion with the Office of the Director

EHR AC members met with the Chief Operations Officer, Dr. Karen Marrongelle to discuss a series of questions raised by the AC.

AC Members were interested in ways NSF is providing support for PIs engaged in DEIA work. NSF directs PI's back to their institutions, because their people can interpret state laws and provide well-informed guidance much better than NSF. However, NSF Program Officers are skilled at helping PIs re-tool or pivot project activities when there are troubled waters to navigate. In many cases, working with NSF after receiving guidance from your institution can be quite productive. NSF stays committed to the goal of broadening participation in STEM, finding the Missing Millions and supporting access and equity in STEM education and professions.

AC members raised questions regarding communication and dissemination across NSF. NSF has a reputation for high quality research and application. Yet augmenting communication with storytelling or other effective ways to get the work of NSF into the hands of a broader audience makes sense.

Education and workforce development was another area of interest of the AC members. The strategies used at NSF to strengthen each area overlap considerably. Our constituencies – those who are looking for workforce training, and those looking for foundational education – is what is most distinguishing between the areas. We have opportunities to support improvements in both areas, and make connections between areas, where appropriate.

Teacher Agency is deemed an important topic by the AC and the OD. We want to enhance and increase the co-led projects (IHEs and K-12 Schools) where teachers play a significant role in leading. There are increasing roles for teachers in projects, and teachers can be powerful allies in dissemination. There is so much opportunity and potential here.

Federal Agency Partnerships is an area of interest of the AC. Dr. Moore co-chairs the Federal Coordinating in STEM education, where members share lessons learned in the work of broadening participation. NSF continues to keep our eye on other organizations and agencies, to see if we need to make adjustments in our work, or to collaborate in new ways.

Session 8: Advisory Committee for Environmental Research and Education Discussion

Dr. Kimberly Jones presented on the Sustainability of Science. She gave an overview of the committee as a whole, its five current initiatives, and Minimizing the Environmental Impact of Research. Questions were brought up regarding whether NSF is doing its part to minimize their impact on the environment and ways that NSF currently factors this topic into its operations and projects.

Discussion involved the implementation of sustainability criteria in the proposal process, expanding the definition of broader impacts to include sustainability of research, and the importance of bringing ethicists into conversations about research. It was emphasized that this is different from research on sustainability and is rather considering environmental impacts of research being conducted. Requests input from the AC on how to best incorporate such a question in the proposal process.