



STEM Education Advisory Panel COMMITTEE MEETING

December 11, 2020

Location: Virtual only via ZoomGov

Members of the public should register in advance at:

https://nsf.zoomgov.com/webinar/register/WN_cpB0w1CjQbKNjSduPanyxA

Advisory Committee Members Present: Gabriela (Gaby) González (Chair), Lizanne DeStefano (Panel Vice Chair), Doug Clements, William Yslas Velez, Robert Mathieu, Bruce Wellman, Arthur Eisenkraft, Laurie Leshin, Robert Semper, Larry Robinson, Jacqueline Huntoon, K. Renae Pullen

New Advisory Committee Members: Tiffany Neil, Francisco Rodriguez, Darryl Williams, Steven Barbato

11:00 – 11:30 am WELCOMING REMARKS

STEM Education Advisory Panel Leadership

The meeting of the STEM Education Advisory Panel Committee was called to order by Ms. Gaby González, STEM Education Advisory Panel Chair. Ms. González introduced the new STEM Education Advisory Panel Vice Chair, Dr. Lizanne DeStefano. Dr. DeStefano then invited four new panel members to briefly introduce themselves.

Ms. González reminded panelists of the objectives of the meeting, as laid out in the American Innovation and Competitiveness Act. The panel's primary charge is to provide recommendations to the Committee on Science, Technology, Engineering and Math Education (CoSTEM) for accomplishing the 2018 STEM Strategic Plan.

11:30 – 12:00 pm SESSION 1: FC-STEM and TIGER TEAMS

FC-STEM Leadership

Dr. Karen Marrongelle, Assistant Director for Education and Human Resources at NSF and Federal Coordination in STEM Education Subcommittee (FC-STEM) Co-Chair, opened the session by providing an overview of the relationship between CoSTEM, FC-STEM, the Interagency Working Groups (IWGs), and Tiger Teams. In addition, Dr. Marrongelle explained that the second FC-STEM progress report, released on the day of the meeting, captured only a portion of FC-STEM work through Spring 2020. Today, some of the additional work not captured in the report will be shared with the panel.

Mike Kincaid, Associate Administrator for National Aeronautics and Space Administration (NASA) Office of STEM Engagement and FC-STEM Co-Chair, acknowledged that the ongoing COVID-19 pandemic created many challenges for agencies. However, FC-STEM created opportunities for agencies

to learn from each other during this time. Two examples provided were the virtual internship community of practice and the Federal STEM Education Listserv.

Cindy Hasselbring, Assistant Director, Senior Policy Advisor, STEM Education, Office of Science and Technology Policy (OSTP) and FC-STEM Co-Chair, elaborated on FC-STEM accomplishments, beginning with the 2020 Progress Report released on the day of the meeting, which fulfills OSTP's annual CoSTEM requirements. Ms. Hasselbring then detailed ways FC-STEM has sought outside stakeholder input, including: collecting information from NSF Presidential awardees on how the 2018 Strategic Plan can be useful to classrooms, presenting at the STEM Ecosystem Collaborators Convening in March 2020, virtually meeting with the Council of State Science Supervisors in April 2020, and posting a public Request For Information (RFI) featuring questions submitted by four IWGs, OSTP, and a tiger team. Finally, Ms. Hasselbring introduced the new Veterans in STEM IWG, which will provide an opportunity to engage agencies not previously involved in the FC-STEM community and better leverage STEM outreach across the Federal government. An update on the activities of this new IWG will be provided at the next panel meeting.

Dr. Nafeesa Owens, Senior Advisor, FC-STEM, and co-chair for the Tiger Team on Online STEM Resources, described the tiger team's activities to date, which include: hosting listening sessions with teachers, higher education faculty, parents, and parent organizations to learn what each stakeholder group would want in an online resource to provide for themselves and their students; conducting an FC-STEM survey to learn materials that agencies could provide for an online resource; including questions in the RFI. The tiger team anticipates providing recommendations to FC-STEM in early 2021.

Dr. Marlene Kaplan, Deputy Assistant Director, STEM Education, OSTP, and co-chair for the Tiger Team on Flexible Hiring Authorities, provided an overview of the tiger team's research on the Federal STEM workforce. The tiger team will provide the panel with a written summary of this research when it is complete. The main themes highlighted included: half of the STEM workforce is in the Department of Defense (DOD), where engineering and IT positions dominate; over the years considered in the analysis, there has been an increase in hiring individuals from underrepresented racial and ethnic groups, but representation of these groups is still lower than desired; the dominant age group making up the Federal STEM workforce is 50-60 years old, while the representation of 20-30-year-old individuals is lower than desired. Dr. Kaplan also provided recommendations from the tiger team, focused on scholarship and fellowship hiring. Specifically, the tiger team recommends expanding expedited hiring authorities for recent college graduates and expanding a 2016 Executive Order to allow for direct hires of more types of fellowship and scholarship students.

The session then opened for questions. Ms. González asked why the State Department is not represented in FC-STEM. Dr. Marrongelle explained that agency investments in STEM must meet a budget threshold to be eligible for membership in FC-STEM. Ms. Hasselbring agreed, and added that FC-STEM still seeks to engage other federal agencies in STEM education efforts. For example, last year FC-STEM hosted a collaborator's convening that included non-FC-STEM agencies like Housing and Urban Development.

Dr. Larry Robinson, President and Director of NOAA's Center for Coastal and Marine Ecosystems, Florida Agricultural and Mechanical University, asked whether any IWGs track investments designed to improve diversity and inclusion (D&I) in STEM, making the point that focusing on increasing hiring is important, but will not be possible without a pool of candidates in the first place. Dr. Marrongelle and Ms. Hasselbring responded that these data are collected in the annual CoSTEM budget data call and are available in the annual progress reports.

Dr. Robert Mathieu, Albert E. Whitford Professor of Astronomy and Director of the Wisconsin Center for Education Research, University of Wisconsin-Madison, asked whether the data presented by the Hiring Authorities Tiger Team indicated that DOD is driving the diversification of the Federal STEM workforce, and whether this should be taken into account when designing interventions. Dr. Kaplan responded that the data may indicate this and added that diversity is a priority for all Federal agencies. Ms. González suggested the data needs to be normalized by agency workforce size in order to better understand which agencies are driving the observed trends.

Ms. Tiffany Neill, Deputy Superintendent of Curriculum and Instruction, Oklahoma State Department of Education, asked for clarification on Dr. Kaplan's statements that representation of certain groups are lower than desired in the Federal STEM workforce; specifically, she asked if the agencies have identified targets for different groups, and whether any agencies have already met targets and can share the strategies they used. Dr. Kaplan indicated that no formal targets have been set, although agencies do report on their workforce relative to the civilian labor force. She agreed it could be helpful to look at hiring practices used by agencies with more diverse STEM workforces, like DOD. Dr. Marrongelle added that the Strategic Plan's vision is for the STEM workforce, including the Federal STEM workforce, to reflect the makeup of our nation, and that the question of how to make this vision measurable will be raised to the CoSTEM leads.

Mr. Bruce Wellman, Chemistry, Engineering, and Robotics Teacher, Olathe Northwest High School, asked whether the individuals receiving scholarships and fellowships reflect the type of diversity the federal government is seeking, in order to justify the recommendation of expanding noncompetitive hiring through these opportunities. Dr. Kaplan responded that diversity varies from program to program, and it could be possible to create a program that would ensure students from Minority Serving Institutions would be eligible for noncompetitive hiring.

Dr. William Velez, Emeritus Professor of Mathematics, The University of Arizona, asked what definition of "URM" [underrepresented minority] is used in the Hiring Authorities Tiger Team analysis, and whether this definition is consistent across all the agencies included in the analysis. Dr. Kaplan responded the tiger team will specify the definition in a written summary provided to the panel in early 2021.

Ms. González asked for FC-STEM leadership to provide an example of collaboration between agencies to achieve the pathways and objectives in the Strategic Plan. Dr. Owens referenced the NSF INCLUDES program, which started in 2018, around the same time the Strategic Plan was released. Since then, eight Federal agencies have become NSF INCLUDES partners, and attend quarterly meetings to discuss enhancing diversity and inclusion in STEM. In addition to this, the NSF INCLUDES community is partnering with the Strategic Partnerships IWG (SP-IWG) for a webinar series to share best practices for virtual internships and Federal undergraduate internship. Finally, a partnership between NSF INCLUDES and NASA Minority University Research and Education Project has expanded opportunities to broaden participation in engineering. Dr. Owens also provided the Collaborators' Convening as another example of collaboration between agencies. This year's CoSTEM data call will collect information on new collaborations emerging from this meeting.

12:00 – 1:00 pm

SESSION 2: INTERAGENCY WORKING GROUPS
IWG Co-Chairs

Dr. DeStefano introduced the session. Dr. DeStefano, who works at Georgia Tech, shared that students do not see the Pathways federal internship program as a good way to get hired. Dr. DeStefano recommended

that if any changes are made to improve the hiring outcomes of the Pathways program, the federal government should do outreach to students.

Ms. Hasselbring presented progress and accomplishments of the Computational Literacy IWG. Dr. DeStefano asked whether there are any specific efforts to provide for teacher professional development (PD) in computer literacy. Ms. Hasselbring indicated that the IWG will use the RFI responses to determine what PD is most needed by teachers. Dr. DeStefano encouraged the IWG to think both about these immediate needs and about a longer-term plan for how teachers can be trained to model computational literacy in everyday life. Dr. Mathieu asked to what extent IWG actions lead to actions “on the ground.” Dr. DeStefano suggested this is a question that SP-IWG can address. Ms. González asked about supporting families during the pandemic, for example by providing WiFi or helping parents teach technology to their children. Ms. Hasselbring responded that OSTP is working with the Federal Communications Commission (FCC) and private industry to improve WiFi access, and that she will provide more information on this to the panel.

Dr. Julie Carruthers, Senior Science & Technology Advisor, Office of Science, U.S. Department of Energy, and co-chair for the SP-IWG, presented on the IWG’s progress. Ms. González and Dr. Darryl Williams, Senior Vice President of Science and Education, The Franklin Institute, asked where families, community-based organizations, and informal learning centers fit into STEM ecosystems. Dr. Carruthers replied that she would have to consult with other agencies that are more directly involved in connecting with STEM ecosystems. Dr. DeStefano emphasized that the types of partners listed by Ms. González and Dr. Williams are important for providing access and equity in STEM ecosystems. Dr. DeStefano then asked whether the IWG is thinking about mentoring, especially culturally competent mentoring, as a means for promoting access and diversity. Dr. Carruthers replied that culturally competent mentoring will be included as part of the best practices compendium for mentoring for federal research mentors. Mr. Wellman asked how the SP-IWG is addressing issues related to the Pathways Program, discussed earlier. Dr. Carruthers indicated this is a conversation that needs to happen with FC-STEM, and further explained that since the Office of Personnel Management (OPM) manages the Pathways Program, every agency would need to be behind reforming the program. Dr. Velez asked a follow-up question about mentoring, inquiring whether there is an effort to distinguish what types of mentoring is necessary for different stages of career development, and to develop trainings for these different scenarios. Dr. Carruthers agreed that it is important point and that it will be considered when putting together the mentoring best practices compendium.

Dr. Jorge Valdes, Program Advisor, Office of Education, U.S. Patent and Trademark Office, and co-chair for the Convergence IWG, presented on the IWG’s progress. Dr. Williams asked how the IWG defines “transdisciplinary” education, featured in the second goal of the IWG, and what evidence would indicate that it was being achieved in the classroom. Dr. Williams elaborated that he defines transdisciplinary as students moving beyond integrating subjects and transcending into the realm of the unknown – he doesn’t think he’s ever seen this in action in the classroom, only in the workplace. Dr. Valdes agreed that transdisciplinary education is a heavy lift and offered that he sees the Next Generation Science Standards and some of the engineering design principles used in this framework as a step in the right direction.

Dr. Eleanor Snow, National Youth and Education in Science Program Manager, Office of Science Quality and Integrity, U.S. Geological Survey, and co-chair for the IWG Inclusion in STEM (IWGIS), began her presentation by explaining how the IWG does not have any Key Federal Actions (KFAs) from the Strategic Plan, but rather is charged to advance the KFAs of the other four IWGs. Dr. Snow reviewed the group’s progress and ended with a discussion of how IWGIS is beginning conversations about ways this year’s COVID-19 pandemic and social unrest might impact their workplan. For example, the IWG

may convene stakeholders to talk about equity in learning during the pandemic. Dr. Douglas Clements, Kennedy Endowed Chair in Early Childhood Learning, Executive Director of the Marsico Institute for Early Learning and Literacy, and Professor, University of Denver, asked whether the IWG included students with disabilities in their scope. Dr. Snow replied affirmatively. Dr. Velez asked whether all demographic data collected by the IWG are disaggregated. Dr. Snow again replied affirmatively.

Dr. Sarah-Kay McDonald, Senior Advisor, NSF, and co-chair of the Transparency and Accountability IWG (T&A IWG), presented on the group's progress. Notably, the IWG's rural and participant designation guidelines pilot is underway, and the IWG will provide results and a recommendation memo to FC-STEM in the 2nd quarter of FY 2021. Ms. Renae Pullen, K-6 Science Curriculum Instructional Specialist, Caddo Parish Public Schools, noted that increasing representation of individuals from underrepresented groups or rural areas is something the federal government is always seeking, but questioned whether the available opportunities (in particular, competitions and challenges) are culturally relevant for these groups, and whether there is any thinking in FC-STEM about whether this is the best thing to be doing for these students. Dr. McDonald agreed this is an important point. It was noted that one of the common activities amongst the IWGs is coming up with definitions and metrics, and asked how these activities are coordinated. Dr. McDonald replied that the T&A IWG has overlapping membership with the other IWGs, and that a standing agenda item is to have members from other IWGs report out on activities relevant to T&A IWG work. She added that IWG co-leads meet regularly, as well as have joint IWG subcommittees. Mr. Wellman noted that his understanding of the accountability mechanisms in COMPETES is to require metrics that may be uncomfortable for the federal agencies, and wondered if the work of the T&A IWG should be supplemented by outside review. Dr. Marrongelle noted that is this the charge for the panel.

1:00 – 1:10 pm

BREAK

1:10 – 2:55 pm

SESSION 3: CoSTEM ACTIVITIES IN SUPPORT OF THE AMERICA COMPETES ACT

Moderated by: STEM Education Advisory Panel Leadership

Ms. Gaby González reminded panelists of their responsibilities, as noted in American Innovation and Competitiveness Act, including formatting and articulating changes for CoSTEM, FC-STEM, IWGs and progress in alignment with Federal STEM Education Strategic Plan. The goal of the current session is to summarize any recommendations to CoSTEM in the report to Congress. Guiding questions as part of the discussion process include: Is there evidence of action towards COMPETES Act requirements? Is there evidence of action to accomplish pathways and objectives of the Strategic Plan? What actions would you like to have seen completed?

(1) CoSTEM shall coordinate the STEM education activities and programs of the Federal agencies

With respect to Requirement **(1)**, based on the panel's initial analysis, panel members found evidence to support meeting this Requirement. There were no major concerns around this particular area.

(2) CoSTEM shall coordinate STEM education activities and programs with the office of Management and Budget

With respect to Requirement **(2)**, based on the panel’s initial analysis, panel members found evidence to support meeting this Requirement. Members discussed how CoSTEM could provide better evidence of coordination across federal programs, as well as ways they could clarify the role of and collaboration with the Office of Management and Budget (OMB) beyond funding. It was noted that when looking at previous data about where progress was made, there is close connection to diversity and tracking with federal inventory. Dr. DeStefano reminded panel members that they could generate recommendations and indicate what steps they would like to see done moving forward.

(3) CoSTEM shall encourage teaching of innovation and entrepreneurship as part of STEM education activities

With respect to Requirement **(3)**, based on the panel’s initial analysis, panel members found evidence to support meeting this Requirement. Members discussed: how CoSTEM could best capture the teaching of innovation and entrepreneurship to ensure focus on skills that would support that kind of learning; concerns that education programs are falling short of impact targets; concerns about how teaching of innovation and entrepreneurship are implemented and achieved; the need for high stakes examinations and initiatives to integrate these concepts; and the need to align with the Department of Education’s work with states and state exams (aligning assessments). Members also suggested that CoSTEM could: differentiate focus for this Requirement by education levels (K-12 vs. Higher Education); leverage STEM ecosystems to help teachers become more comfortable with teaching these topics; and frame innovation and entrepreneurship intentionally within the process of student learning, understanding, and skills.

(4) CoSTEM shall review STEM education activities and programs to ensure they are not duplicative of similar efforts within the Federal government

With respect to Requirement **(4)**, based on the panel’s initial analysis, panel members found evidence to support meeting this Requirement. Panel members questioned whether “duplication” must necessarily carry a negative connotation and suggested that, in fact, duplication is needed to motivate conversations among agencies to strategize, improve, and coordinate activities in a synergistic manner. Mr. Wellman noted that he was not sure whether he saw this evidence, as such granularity was not made clear in the progress report. Ms. Hasselbring clarified that the progress report includes what is required from OSTP and added that CoSTEM has a broader charge. Ms. González asked members to consider duplication within different contexts, providing duplication of audience (e.g., students) as an example. It was noted that it would be important for CoSTEM to look at the array of opportunities and complements. One specific example may be to investigate what is being done beyond career awareness, noting what pathways exist to get individuals into STEM careers. Marlene Kaplan suggested there is very little duplication and overlap and that agencies have lots of the same audiences, etc. but they are different individuals.

(5) CoSTEM shall develop, implement through the participating agencies, and update once every 5 years a 5-year STEM education strategic plan, which shall—

(A) specify and prioritize annual and long-term objectives;

(B) specify the common metrics that will be used to assess progress toward achieving the objectives;

- (C) describe the approaches that will be taken by each participating agency to assess the effectiveness of its STEM education programs and activities; and
- (D) with respect to subparagraph (A), describe the role of each agency in supporting programs and activities designed to achieve the objectives

With respect to Requirement (5), based on the Panel’s initial analysis, panel members found evidence to support meeting this Requirement.

With respect to sub-item (A), members discussed the shift to virtual work-based learning opportunities as a result of COVID-19 and noted that CoSTEM could consider ways to apply lessons learned in the long term. Additionally, as a result of COVID, it was recommended that CoSTEM pay particular attention to science as a process, as well as scientific literacy and its impact on shaping how younger generations view becoming a scientist. Overall, priorities have shifted as a result of the pandemic, and members wondered whether there is an opportunity to revisit the five-year Strategic Plan.

With respect to sub-item (B), members noted that this is one of the most challenging aspects, and that emphasis on common metrics is needed in order for programs to make progress. Members suggested that CoSTEM indicate geographic impact of programs, specifying locales that are being targeted (e.g., national vs. local labs). Dr. Arthur Eisenkraft, Distinguished Professor of Science Education and Director of the Center of Science and Math in Context (COSMIC), University of Massachusetts, Boston, noted that the table in Appendix 3 of the progress report does not make clear what criteria was used, how the criteria was decided, and whether agencies filled the information out themselves. NOAA and DoD appear to meet every criteria across the board, but DOE and another agency (?) do not, for instance. Dr. Marrongelle clarified that the characterization of the chart is correct - agencies self-reported on their investments. A member suggested that CoSTEM must shift from reporting on numbers to a better sense of impact, either based on agency goals or the Strategic Plan. Further discussion included developing infrastructure for impact and evaluation, and the need for national accountability for evaluation in STEM.

With respect to sub-item (C), Dr. Eisenkraft suggested that agencies think more deeply about increasing diversity and inclusion in relation to the goals and pathways of the Strategic Plan moving forward. Ms. González asked whether this was being considered by T&A IWG. Panel members also discussed that, as written, it is difficult for federal agencies to have clear or coherent guidance on goals and evidence-based perspective from the Strategic Plan. Dr. DeStefano reminded panel members that the Evaluation Subcommittee is seeking new membership, which can provide opportunity for input with respect to this particular issue.

With respect to sub-item (D), members referred to appendices 1, 3, and 4 to point to program lists, and which goals and pathways were engaged. Members agreed that each agencies’ role is largely interpreted, as far as each agency listing investments versus integrating strategy in a scaffolded way. Members agreed that the role of each agency goes beyond just what they are doing. It was suggested that CoSTEM should consider moving away from lists and address strategic planning. As an example, it would be important to look across the roles of all agencies to determine which US populations are still not being reached, in order to cover the perimeter space and domains with minimal duplication. Members expressed wanting more information and data in support of changes in programs, including changes in funding, to help understand how and why programmatic changes happen. Dr. Marrongelle noted that agencies develop budgets independently, with OMB, and will likely do so in the future. Mr. Kincaid expressed gratitude for the Panel’s input and comments, adding that agency agreement and coordination takes time.

- Arthur Eisenkraft: Recognize difficulty of getting the data; as a researcher we know we always want more; in looking at “charting a course” and the updates – no changes in some agencies or changes in others. Is metric poorly understood? What underlies this change? Did the people completing it change or did the

programs actually change? Would like more information about supporting these data.

- K. Renae Pullen: Some programs were unfunded or funded differently or see big changes in funding. By the end, wondering: did we get enough information to understand what precipitated these changes? Not sure we can get that information now? What does change in funding mean?
 - Gaby: Many differences could be understood, just want to understand why/how these changes came about.
 - Karen Marrongelle: Important to point out here that agencies develop budgets independently and likely we will do so in the future. Also, budget development is between an agency and OMB.

- (6) CoSTEM shall establish, periodically update, and maintain an inventory of federally sponsored STEM education programs and activities, including documentation of assessments of the effectiveness of such programs and activities and rates of participation by women, underrepresented minorities, and persons in rural areas in such programs and activities

With respect to Requirement (6), based on the Panel's initial analysis, panel members found evidence to support meeting this Requirement. However, the Panel's consensus was that while evidence of progress (an inventory) exists, other parts of the charge were not strongly addressed. Members noted that some of the items in the inventory did not have evidence of assessment or effectiveness. Additionally, there was agreement about a lack of clarity in how various groups (e.g., underrepresented minorities) were defined in relation to agency programs and activities. Members also noted that CoSTEM could include a clear acknowledgement in the report about next steps with respect to this Requirement. More generally, members would like more frequent communication from CoSTEM and FC-STEM on progress towards outcomes, and a more robust plan to keep the panel up to date beyond formal reports.

2:55 – 3:05 pm BREAK

**3:05 – 4:50 pm SESSION 3: CoSTEM ACTIVITIES IN SUPPORT OF THE
COMPETES ACT CONTINUED**
Panel Subcommittee Co-Chairs

Bruce Wellman expressed concern for students' mental health in PK-12. He noted that there are not enough substitute teachers.

Ms. Gaby González reminded panelists that they must register within the NSF system to confirm their attendance. She also reminded panelists that the goal of the current session is to continue summarizing any recommendations to CoSTEM regarding activities in support of the COMPETES Act.

- (7) CoSTEM shall collaborate with the STEM Education Advisory Panel established under section 303 of the American Innovation and Competitiveness Act and other outside stakeholders to ensure the engagement of the STEM education community

With respect to Requirement (7), based on the Panel’s initial analysis, panel members found evidence to support meeting this Requirement. However, several concerns were raised around incorporating some of the..... impact of COVID-19 as well as other social issues experienced over the past year. Panel members urged CoSTEM to think about how to address these issues, and how to ensure that CoSTEM and the STEM Education Advisory Panel are being proactive in engaging the full extent of the STEM education community. Members discussed the dissemination of the public RFI, and how many responses were received from the education community. Ms. Hasselbring responded that over 100 responses were received from organizations, associations, higher education institutions, K-12 schools, student groups, teacher organizations, etc. She added that FC-STEM plans to make those responses public in the near future. Several panel members suggested that CoSTEM should have consistent and intentional ways to reach out to stakeholders and communities that are served by federal programs, in order to facilitate mutual development of those initiatives. Members also noted that the Federal STEM Education Strategic Plan and subsequent progress reports are more geared towards federal agencies, with little to no guidance for states and the community at large. This presents a challenge for state and district-level implementation; there is a disconnect between document guidance, state adoption, and the real impact on the field. Members recommended that CoSTEM expand focus beyond federal agencies and provide guidance inclusive to states. Diversity, equity and inclusion were brought up as top concerns, and members wondered whether enough emphasis is being placed on dissemination of information to Minority-Serving Institutions. Dr. DeStefano inquired whether her and Ms. González could solicit feedback in the form of surveys or interviews from members of the Advisory Panel and other stakeholders. The purpose of doing so would be to reflect and gather data on what is working and what must be changed with respect to this Requirement. Dr. Nafeesa Owens responded that she would have to check with legal and advisory managers regarding self-examination and data collection. Dr. DeStefano added that it may also be helpful for the panel members to interact with the IWGs more frequently. Panel members asked for more clarification on the panel’s advisory role with respect to oversight of CoSTEM activities and engagement with the greater community. Dr. Owens noted that there will be follow-up with respect to these items in the future and thanked panel members for the ability to hear this conversation.

(8) CoSTEM shall review the measures used by a Federal agency to evaluate its STEM education activities and programs

With respect to Requirement (8), based on the panel’s initial analysis, panel members found evidence to support meeting this Requirement. However, it was noted that three panel members felt that not enough evidence was found. While panel members felt that common definitions developed by the IWGs and the RFI would be helpful, members felt that: 1) there was not a lot of evidence in the report for the actual review of metrics that are being used by federal agencies; and 2) there is a disconnect between the work of the IWGs and this particular Requirement. Others felt that reviewing individual agency metrics was not as satisfactory as common metrics. Members discussed how to interpret the statutory verbiage in this Requirement (e.g., “a Federal agency”). Dr. Owens noted that this is the first time that the Advisory Panel, as a group, has come together to do this assessment. This provides an opportunity for the group to create a collective understanding of how to interpret this legislation and establish a baseline for what “progress” will look like in the future. This is more about evidence of action vs. evidence of progress.

(9) CoSTEM shall request and review feedback from States on how the States are utilizing Federal STEM Education programs and activities

With respect to Requirement (9), based on the panel's initial analysis, panel members did not find clear evidence to support meeting this Requirement. Members were not clear on how state feedback with respect to the Federal STEM Education Strategic Plan makes it back into the system. Likewise, as noted in discussion of Requirement (7) there was no guidance provided to States on how to implement or align their State plans with the Federal STEM Education Strategic Plan. However, it was noted that from the IWG report-outs in Sessions 1 and 2, it seemed that there were more attempts to receive feedback from states in the roundtables and some of the other activities of the IWGs. Members asked for insight into the process of how information from the roundtables and other activities was being integrated, as well as insight into who is using Federal STEM programs and what impact they have on the STEM education ecosystem. Ms. Cindy Hasselbring spoke to how states are using the STEM Education Strategic Plan, providing an example of a state in the south that just formed nine STEM hubs regionally and are using the Strategic Plan as a framework. There was also a question added to the RFI about how the Strategic Plan is being used. Dr. Owens added that FC-STEM has engaged states before, such as during the Federal State STEM Summit in May 2018, which provided an opportunity for state representatives to provide input for what the plan should include. Prior to the COVID-19 pandemic, there were plans to hold follow-up meetings, such as a state and Collaborators' Convening. However, FC-STEM has not had a chance to reconsider the best way to hold such as convening given the current situation of the pandemic. Dr. Yslas Velez asked what regular mechanisms exist for federal agencies to receive feedback from states on their programs. Dr. Owens responded that the mechanism largely depends on what type of feedback is being received, and which audience is the focus. One way to do so is to pull data from existing databases or resources. Another way might be to attend a state supervisor's meeting for mathematics or science. Ms. Tiffany Neill, added that she agreed with Dr. Owens and noted that it would be important for the group to decide on a consistent definition for who is identified as "the state." She elaborated that feedback has sometimes been at the Governor's office level, which may not be closely tuned into the STEM community and programs. Consistency in outlining and documenting interpretations is necessary moving forward. Dr. Velez suggested that states may not be the appropriate choice for getting feedback on STEM programs, as they have a wide clientele. Mr. Kincaid asked the panel to continue thinking about suggestions for other terms to use in this requirement instead of "states," and thanked the panel for their helpful discussion and feedback. Members asked further questions about the public RFI, including who is managing the information and how it is being compiled and disseminated. Ms. Hasselbring answered that the RFI was an FC-STEM and IWG effort, but NSF and OSTP have been coordinating the data. There is currently a contractor working to analyze the information received. A member requested to see an analysis of respondent typology when it is available. In response to Mr. Kincaid's previous question, Mr. Bruce Wellman commented that for him the target group would be at the practitioner level, where the effectiveness of federal STEM education programs is more important. He added that it is more important to see who is being impacted, and that geographically diverse areas and a broad spectrum of the country are identified, versus looking at state lines. Ms. Gaby González suggested that the panel revisit this item after the results and analysis of the RFI are available, to see if there is opportunity for further recommendations.

(10) CoSTEM shall recommend the reform, termination, or consolidation of Federal STEM education activities and programs, taking into consideration the recommendations of the STEM Education Advisory Panel

With respect to Requirement **(10)**, based on the panel's initial analysis, panel members did not find clear evidence to support meeting this Requirement. Members noted that they felt it is too early in the process for CoSTEM to make recommendations. Nevertheless, they did not see obvious steps taken towards this Requirement. Mr. Wellman asked Dr. Marrongelle about the federal budgeting process, specifically whether Strategic Plan priorities are discussed when budget decisions are made. Dr. Marrongelle replied affirmatively on behalf of NSF, and noted that all budget requests are made public on the NSF website. The Strategic Plan is explicitly factored into the budget of the Directorate for Education and Human Resources.

Prior to closing the current session, panel members spent several minutes prioritizing the work to be focused on with respect to the COMPETES Act requirements. Members noted the following areas as priorities for focus: more cross-agency coordination and collaboration, and highlighting more examples that demonstrate this; the development of common metrics that will distinguish between intent of program(s) and their actual impact(s); developing and communicating a clear mechanism to receive feedback from stakeholders; investigating whether there are success indicators (related to common metrics) that speak to the effectiveness of STEM education programs, and how those indicators can be sustained; further investigating sustainability and scalability for programs; a more concerted focus on understanding the evidence base for computational thinking and transdisciplinary learning; looking across Computational Learning, Strategic Partnerships, and Convergence IWGs to help inform the work of each IWG as well as recommendations for educators; creating a typology of the various elements of computational literacy and placing each agency within that typology; and re-emphasizing the central goal of increasing diversity, equity, and inclusion in STEM. Panel members noted that they were impressed with the infrastructure established by CoSTEM, including FC-STEM, the IWGs, and relationships therein.

Dr. DeStefano adjourned the session at 4:25 p.m.

4:50 – 5:00 pm BREAK

**5:00 – 5:15 pm SESSION 4: STEM EDUCATION ADVISORY PANEL
SUBCOMMITTEES**
Panel Subcommittee Co-Chairs

Members reconvened for Session 4 at 4:35 p.m.

Dr. DeStefano provided updates, future points of focus, and accomplishments of the Evaluation Subcommittee. The Subcommittee will take the panel's feedback on analyzing impact and evaluation metrics. The group's focus is to investigate how to identify effective STEM education programs and share them with the community. Thus far, the Subcommittee has partnered with Diversity & Inclusion subcommittee Co-Chairs, met with T&A IWG and Convergence IWG, and established a repository. Dr. DeStefano recognized past committee members and expressed the need for more members in the Evaluation Subcommittee. Future plans consist of: providing comments on the 2020 Progress Report; scheduling regular subcommittee meetings and inviting other subcommittee Chairs; meeting with the IWGs and continuing to coordinate with them; developing a strategy for identifying effective STEM education programs; and creating a rubric for summarizing and communicating effective programs and practices.

Ms. González brought up Impact Genome and suggested that the panel invite the group to share their work and methods. Impact Genome is developing a model to (evaluate impact? Metrics?). Their model may be a good starting point for developing an NSF evaluation rubric.

Dr. Yslas Velez, Co-Chair for the Diversity and Inclusion Subcommittee, gave an update on the subcommittee's work. Thus far, the Subcommittee met with the IWGIS and heard about their work plan. It was noted that the Subcommittee charge has been updated to account for the IWG's workplan. Current goals include: identifying common metrics for assessing impact on URM in STEM; identifying evidence-based, promising, and emerging practices for increasing diversity in STEM; and supporting broad dissemination of the final IWGIS best practices document.

Following the overview, Dr. Mathieu noted that there is confusion on the charge to identify what are "best practices." Furthermore, Dr. Velez added that the subcommittee would still like further clarity regarding its charge, which is very broad. Ms. González confirmed that plans will be made to visit with the co-chairs to clarify the role of the subcommittees. Dr. Clements commented that a distinction must be made between "research-based" and "evidence-based," and expressed the importance of "practice-based evidence" instead. Questions included using ESSA guidance and their definition on evidence for coherence with what states and districts are asked to use.

Mr. Wellman provided updates of the Educational Pathways and Best Practices Subcommittee. The subcommittee was charged with identifying and recommending best practices / exemplars for distance learning and models of STEM ecosystems. The subcommittee distinguished between "promising practices" and "best practices." Thus far, the group has met with Computational Literacy and Strategic Partnerships IWGs, aligned efforts to prioritize best practices focused on remote learning for PreK-16, and discussed the need to clarify types of partnership categories. Future actions include: broadening of the program; exploring public-private-philanthropy partnership (PPPP); putting out a formal request to the larger stakeholder community for nominations of programs, program evaluations, and research papers that can serve as guidance for promising practices in remote learning; and assembling a literature review of available research for best practices in remote learning, PreK-16 STEM ED, and strong PPPP connections. A member asked in the chat whether the documents and guide to meet subcommittee goals will be shared with the panel. A member commented in the chat that the subcommittee may be interested in consulting the following resource related to research and practice: <http://researchandpractice.org/>

5:15 – 5:30 pm

CLOSING REMARKS

STEM Education Advisory Panel Leadership
FC-STEM Leadership

Ms. Gaby González thanked the panelists for the great discussion. She recognized members who are leaving the panel to continue with their careers. The panel will reconnect after the holidays in 2021 and a document with consolidated feedback from this meeting will be provided. Next steps include working on how to move forward and putting together the first draft of the report to Congress outlining recommendations for CoSTEM. There will be plans to find resources and support for the Diversity and Inclusion Subcommittee, to ensure that the subcommittee is clear on their charge.

Ms. González recognized and thanked everyone who made the panel meeting possible, including all the lead agency representatives who helped organize and took part in the meeting. Dr. Lizanne DeStefano also thanked everyone for their patience with the online format. Prior to closing, a panel member asked how much of CoSTEM would change with the incoming Administration, and whether Ms. Hasselbring

would stay in her role. Federal agency representatives expressed gratitude for the feedback received at the meeting.

The panel meeting was adjourned at 5:?? pm