



**Minutes from the NASA Advisory Council Ad Hoc Task Force on
Science, Technology, Engineering
and Mathematics (STEM) Education**

**August 28, 2018, 9:30 am – 2:30 pm PDT
NASA Ames Research Center/Virtual Meeting**

STEM Task Force Council Members

Present: Cristin Dorgelo (virtual), Norman Fortenberry, Ray Mellado, Darryl Williams (virtual), and Aimee Kennedy, Chair

Absent: Daniel Dumbacher, Michael Lach, Carl Person

Others Present:

Executive Secretary: Beverly Girten, NASA HQ Office of STEM Engagement

Michael Kincaid, NASA HQ Office of STEM Engagement

Robert LaSalvia, Rick Gilmore, Catherine Graves, Tara Strang, NASA Glenn Research Center

Opening Comments

Dr. Beverly Girten, Task Force Executive Secretary, called the meeting to order and extended a welcome to the new task force members: Ms. Cristin Dorgelo, President and CEO, Association of Science-Technology Centers; Mr. Daniel Dumbacher, Executive Director, American Institute of Aeronautics and Astronautics; Dr. Norman Fortenberry, Executive Director, American Society for Engineering Education; and Dr. Darryl Williams, Senior Vice President of Science and Education, The Franklin Institute. Dr. Girten then asked each member to identify themselves and discuss why they are passionate about their work in STEM Engagement, beginning with Dr. Aimee Kennedy, Task Force Chair. Dr. Kennedy welcomed the new members and acknowledged the new NASA Administrator, Mr. Jim Bridenstine. She also acknowledged those on the phone who dialed into learn about NASA STEM Engagement. As Senior Vice President for Education and Philanthropy at Battelle and previously and a principal and high school teacher at a STEM school, Dr. Kennedy has seen firsthand the power of a great STEM education and witnessed the passion ignited by STEM. Mr. Ray Mellado welcomed the new members and stated the importance of their expertise for the group and NASA. Mr. Mellado is driven by his passion and belief that underserved communities can contribute to world class STEM. He founded and dedicates his career to Great Minds in STEM which promotes STEM careers in underserved communities. Mr. Mellado also firmly believes STEM education can change families, cultures and countries and is the most sustainable form of social justice. Ms. Cristin Dorgelo is proud to support science centers and museums that everyday across the United States connect kids with STEM. She witnesses on a daily basis the spark kids have when given the opportunity to participate in STEM. Ms. Dorgelo has worked on Grands Challenges initiative and firmly believe the more people are connected with STEM, the more able we as a nation are to solve the great challenges. Dr. Fortenberry is pleased to contribute to the task force and believes in the power a STEM education affords individuals to be able to support their families. He works to advance innovation in engineering education across all levels. As a former classroom professor, he understands the significance of classrooms and believes teachers have a responsibility to be well

educated to truly inspire students. Dr. Darryl Williams, Senior Vice President of Science and Education, The Franklin Institute, is inspired by work he has seen in Philadelphia and during his tenures at Tufts University and the National Science Foundation. He spends a great deal of time thinking about the workforce of the future and how we can best build infrastructure to support students in STEM. Dr. Beverly Girten has always been passionate about space and education. Her previous roles as high school biology teacher, faculty at Wright State University School of Medicine, and postdoctoral fellow in aerospace physiology along with 20 years of NASA experience have all merged and led to her ideal and current position of Institutional Engagement Director within NASA's Office of STEM Engagement. Mr. Mike Kincaid, Associate Administrator for STEM Engagement, noted August 28th marked his 31st anniversary at NASA where he started as a co-op student at Johnson Space Center. Mr. Kincaid is driven by the passion the NASA workforce has for the work they do coupled with their passion to share that work with external communities. He works to inspire and ultimately employ students by making the outside world more engaged and aware of the work that NASA is doing

Office of STEM Engagement Update

Mr. Kincaid explained the then Acting Administrator made the decision in October 2017 to change the name of Office of Education (OE) to Office of STEM Engagement (OSE). Congress agreed with the name change, which is just short of being finalized. The new name, Office of STEM Engagement, is more reflective of where the office is headed and how it aligns with the Agency's vision and mission. Mr. Kincaid shared the three OSE focus areas moving forward:

- Create **unique opportunities** for students and the public to contribute to NASA's work in exploration and discovery.
- Build a **diverse future STEM workforce** by engaging students in authentic learning **experiences** with NASA's people, content and facilities.
- Strengthen **public understanding** by enabling **powerful connections** to NASA's mission and work.

Mr. Kincaid then discussed the key differences between how OE and OSE function. OSE will start with mission directorates, specifically, look at what the mission directorates are doing and then identify ways to involve students in the missions. Mr. Kincaid shared the US Department of Education concept of the STEM Learning Ecosystem where various organizations and institutions (preK-12 schools, out of school learning programs, higher education, business communities, STEM-rich institutions and families) come together to serve students in their own ways. He discussed NASA's unique contributions to the STEM ecosystem. Mr. Kincaid then outlined the STEM Engagement Roadmap for developing a STEM Engagement strategy and operational model emphasizing students as the beneficiaries of NASA STEM Engagement. While NASA works with institutions and educators, the end goal is reaching students and demonstrating that the efforts are making a difference. OSE changed governance within the Agency. For example, the evaluation function moved from Headquarters to Glenn Research Center (GRC). The evaluation team has made remarkable progress in less than one year since being relocated to GRC.

Mr. Kincaid shared a visual of the road map, a new architecture for enabling student opportunities and contributions. He discussed how partnerships with external organizations leverage resources to increase impact. Mr. Kincaid discussed the fiscal climate, reviewing the president's budget request in comparison to House and Senate proposed budgets. If budget not passed by October 1, 2018, NASA will operate under the Fiscal Year 2018 budget through a continuing resolution. Mr. Kincaid gave an update of the Business Services Assessment Implementation Phase noting that within the past year STEM Engagement has made tremendous progress in meeting milestones.

Addressing the programmatic side of OSE, Mr. Kincaid shared key milestones for the National Space Grant and Fellowship Program, including the 2018 record for placing 25 Space Grant interns at NASA Centers. Through this, NASA programs are more closely connect to Space Grant. Space Grant paid for the student stipends. OSE will also cover the cost for ten students to go to the Southern Regional Education Board (SREB) Institute for Teaching and Mentoring, which has become the largest gathering of minority doctoral students. Mr. Kincaid described the Minority University Research and Education Project (MUREP) and shared recent MUREP awards. He then shared key activities of the Established Program to Stimulate Competitive Research (EPSCoR) and described how EPSCoR starts with the mission directorate needs. Mr. Kincaid shared that the STEM Education and Accountability Project (SEAP) will change to NextGen STEM which will focus on mission driven initiatives to engage with students. Mr. Kincaid described Teams Engaging Affiliated Museums and Informal Institutions (TEAM II) and the differences from its precursor, the Competitive Program for Science Museums Planetariums and Visitor Centers (CP4SMPVC). The TEAM II budget of \$10 Million is much smaller than the \$25 Million CP4SMPVC budget. The reduced budget prompted a rethinking of the competition. Proposers were to focus on one of two themes: "Small Steps to Giant Leaps" to acknowledge the 50th anniversary of the Apollo 11 landing or "Beyond Low Earth Orbit." In addition, proposers had to show they were connected to a large network which would benefit from their efforts. Requirements for proposers include use of the Museum Alliance, a network of over 1000 affiliated members across the nation, and establishment of a network beyond the Museum Alliance so additional partnering organizations are tied in to participate in award. Dr. Girtten added that they the change in approach is to leverage smaller amounts of money to reach more students resulting in a larger impact per dollar spent. Dr. Girtten then briefly described each of the three awards. Dr. Kennedy noted that the three awardees received \$2.1 Million of funding and are engaging 90 partners.

Mr. Kincaid discussed the Year of Education on Station (YES), noting the good fortune of having two educator astronauts back to back on the International Space Station (ISS), each on a six-month mission. He stated NASA has four of six astronaut spots on the ISS. STEM on Station was able to increase the number of downlinks to 65 from the planned 58. Mr. Kincaid discussed the history of "Christa's Lost Lessons". Challenger Center, in partnership with NASA and STEM on Station, worked to complete several of the lessons Christa McAuliffe had planned for the Challenger STS 51L Teacher in Space mission. Working with Astronauts Ricky Arnold and Joe Acaba, the demonstrations, or "STEMonstrations" were filmed aboard the International Space Station and corresponding lessons were developed for classrooms.

Dr. Fortenberry questioned if there are other assumptions embedded in name change in addition to the change towards mission-driven strategic engagement. Mr. Kincaid identified a couple of factors that went into name change. One factor is that NASA is changing the way things are done. The new name reflects that things are different. Congress previously saw education at multiple federal agencies as a duplication of effort. NASA's role is engaging kids in NASA content. NASA is not duplicating other agencies. Dr. Williams then asked about shared goals and metrics across STEM agencies. Mr. Kincaid responded by sharing the history of the interagency Committee on Science, Technology, Engineering and Mathematics Education (CoSTEM). The five-year strategic plan published in May 2013 just completed its intended timeframe. Overall, CoSTEM accomplished what it set out to do but did not track underrepresented populations to ascertain whether or not they were successful. The Trump Administration brought on Mr. Jeff Weld, as Senior Policy Advisor in STEM Education for the White House Office of Science and Technology Policy (OSTP). Mr. Weld is a former high school teacher and

university professor. For the past seven years Mr. Weld served as Executive Director of the Iowa Governor's STEM Advisory Council. OSTP is busily working on new five-year plan. The plan is currently an internal document which should be released nationally in the November or December timeframe. Every agency has unique role. Agencies are not duplicating efforts but they are coordinating. The panel that advised the effort had their first meeting last weekend. Ray Mellado and Aimee Kennedy are both on that panel as well. Mr. Mellado noted that when CoSTEM met over the years they noted they all have a future STEM workforce and discovered that while there are similarities, each agency has unique needs.

Mr. Kincaid shared information about the upcoming Space STEM Forum on September 19, 2018. The Space STEM Forum will look at ways to celebrate on a national level the 50th anniversary of the Apollo landing. What does exploration look like 50 years after the landing and what will exploration look like in 50 years? Many organizations are already planning and making an investment for national efforts to celebrate the anniversary. The forum will bring people together to share ideas. The goal of the forum is a shared set of resources for all to access and use. We will create a web site to serve as a centralized hub of events, activities and resources. It will also be a tool for people interesting in creating their own activities to celebrate the Apollo anniversary. The Office of STEM Engagement received approximately 22 abstracts, of which approximately 16 are for national efforts and 6 are for resources and capabilities. Dr. Girtten added the web site will be a key outcome of this effort. The idea is to keep the initial group attending the forum relatively small, then engage many more people and organizations through the web site. Ultimately, the anniversary is a one-day celebration. This group will work on initiatives that will have longer lasting impact. Dr. Girtten shared top level ideas from the abstracts. She also confirmed the attendees from external organizations are those that whose abstracts were selected. After the website is created and ideas are curated, it will be available for all to use. Dr. Kennedy noted the celebration can serve as a launchpad for educators for the 2019-2020 academic year.

Update on STEM Education Advisory Panel & 5 Year Plan

Dr. Girtten updated the group on the Federal STEM Education 5-Year Strategic Plan, 2018-2023. She noted the previous plan (2013-2018) focused on federal agencies. This follow-on plan will emphasize federal agencies as well as state and local agencies. Dr. Girtten shared the goals of the strategic plan and how they map to Administration priorities for STEM education.

Evaluation and Performance

Mr. Rob LaSalvia, Division Chief at NASA Glenn Research Center and Lead for Performance Monitoring and Evaluation, began the update on the fiscal year 2019-2020 performance measurement strategy, framework, and measures since last briefing to the Task Force in March 2018. He presented four key takeaways upfront from the development of the candidate performance measures: Comprehensive Performance Management Strategy; Supports Agency Level STEM Engagement (SE) Strategy; Rigorous Performance Monitoring; and Collaborative and Evidence-Based Approach.

Mr. Rick Gilmore, Office of STEM Engagement Evaluation Lead, then reviewed the three step process for developing external and internal performance measures, noting the team is in the third step which is to finalize the candidate performance measures. The team made recommendations for candidate measures to support NASA Strategic Goal 3.3, including annual performance indicators and strategic objectives. Dr. Fortenberry questioned if the team also included an indication of what the success

criteria are. Mr. Gilmore responded that the team did and that he could follow up with Dr. Fortenberry to discuss further.

Dr. Cathy Graves, Lead Evaluation Specialist, elaborated on the Fiscal Year 2019 and Fiscal Year 2020 performance assessment model. She noted the external and internal performance indicators are working their way through internal NASA review and will then go to the Office of Management and Budget for approval. In Fiscal Year 2019, the team will look at best practices across Agency for programmatic strategic investment area functions. Dr. Graves described the process of identifying performance measures for candidate performance goals. She noted that in Fiscal Year 2019, evaluation efforts will be focused on higher education institution grants and awards, higher education design challenges and competitions, and higher education internships and fellowships. Dr. Graves also identified the assessment focus areas for these three areas. Dr. Kennedy asked how performance goals align to NASA strategic goals and if Office of STEM Engagement sets these goals to which Dr. Graves noted the Office of STEM Engagement writes performance goals that should live through the life of the strategic plan. Dr. Tara Strang then finalized the presentation sharing a chart on how the team developed a performance assessment strategy that aligns with NASA's larger goal and the Office of STEM Engagement goal for performance assessment.

Mr. Kincaid commented that several people from Office of Management and Budget commended the Evaluation Team's work and asked them to present as a monthly speaker to share what they have done.

Responding to question from Mr. Mellado, Mr. LaSalvia noted that some of this work has influenced the fiscal year 2018 performance measures but noted that this is forward looking work and they anticipate have data by third or fourth quarter of fiscal year 2019.

Dr. Kennedy applauded the work of the group and the pace at which they have been making progressed. She also asked if goals are being drawn from the programmatic work Mr. Kincaid presented earlier. Mr. LaSalvia responded there is intentional alignment. They are carefully focusing on what they intend to measure. Dr. Williams asked about the teams thoughts for preparing for longitudinal assessment. Mr. LaSalvia responded that is a persistent question for the team. They are going to start longitudinal assessment at the higher education level. Preparing for a longitudinal study can be lengthy as it can take up to 9 months to get Office of Management and Budget approval.

Discuss Findings and Recommendations

Dr. Kennedy stated she will have 30 minutes to share findings and recommendations with the NASA Advisory Committee (NAC) on Wednesday, August 29, 2018. A finding is sentence or two to share with NAC, a statement of fact we found. A recommendation is something we ask the NAC to approve. The recommendation we have been surfacing for a year is to elevate the Ad-Hoc Task Force status, which has been in place for 43 months. The recommendation has been favorably received by the NAC but several members suggested waiting for a new NASA administrator to be in place before decision is made. Dr. Kennedy stated that by November 2018 the Task Force needs to be renewed or elevated or it will no longer exist. The Task Force agreed the presentation should start with the recommendations.

Mr. Kincaid shared that he spoke with the NASA Administrator Jim Bridenstine about the recommendation and also about the new Task Force members and the Administrator was supportive of the process.

The Task Force members then discussed and agreed on key points to include in the presentation to the NAC:

Recommendation

Recommendation 1 - Elevate the Ad-Hoc Task Force Status

- The NASA Advisory Council Ad-Hoc Task on STEM Education should become a regular committee of the NAC.

Major Reasons for the Recommendation:

- A regular committee of the NAC that focuses on STEM Engagement, and is made up of representatives from key stakeholder groups, will provide a set of diverse perspectives from different constituent groups about trends and current events in the national STEM movement.

Consequences of No Action on the Recommendation:

- The institutional knowledge developed by the current task force over the last 43 months will be lost.
- The Terms of Reference for the NASA Advisory Council Ad-Hoc Task Force on STEM Education indicate that with no extension or formalization, the Task Force dissolves in November of 2018.

NAC STEM Education Task Force Members

Introduce new members to the NAC.

BSA Implementation and Office of STEM Engagement Update

- Update the NAC on BSA Implementation Phase FY2018 Milestones
- Vision and Mission for STEM Engagement and Outreach
- New Architecture Enabling Student Opportunities and Contributions
- Call Out Key Programs: Space Grant, MUREP, EPSCoR, SEAP (NextGen STEM)
- Year of Education on Station (YES) and Christa's Lost Lessons

NASA Contributions to National Efforts

- NASA Space STEM Forum
- Federal STEM Education 5-Year Strategic Plan

Evaluation and Performance Measures

- Glenn Research Center leading the Office of STEM Engagement evaluation and performance measurement efforts.
- NASA recognized as leader among federal agencies for evaluation of STEM Education efforts.
- Review process of developing performance measures.

Adjourn Meeting

Dr. Girtten adjourned the meeting at 2:30 p.m.