

**COMMITTEE ON EQUAL OPPORTUNITIES IN
SCIENCE AND ENGINEERING (CEOSE)
National Science Foundation**

**MEETING MINUTES
June 19-20, 2014**

MEETING PARTICIPANTS

<p><u>CEOSE Members Present</u> Dr. Karl S. Booksh, University of Delaware, DE Dr. Ira Harkavy, University of Pennsylvania, Philadelphia, PA Dr. Charles Isbell, Georgia Institute of Technology, GA Dr. Robert Jones, University at Albany, NY Dr. Alicia Knoedler, University of Oklahoma Dr. Louis A. Martin-Vega, North Carolina State University Dr. George Middendorf, Howard University, Washington, DC Dr. Alexander Ramírez, San Antonio, TX Dr. Wendy Raymond, Williams College, Williamstown, MA Dr. Keivan G. Stassun, Vanderbilt University, TN Dr. Joseph A. Whittaker, Morgan State University, MD</p>	<p><u>CEOSE Members Absent</u> Dr. Gregory Cajete, University of New Mexico, NM Dr. Evelyn Hammonds, Harvard University, Cambridge, MA Dr. Robert Eugene Megginson, University of Michigan</p>
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<p><u>Federal Agency Liaisons Present</u> Ms. Lisa Evans, J.D., National Institutes of Health Dr. Meldon Hollis, White House Initiative on Historically Black Colleges and Universities Dr. Era Marshall, Smithsonian Institution Dr. Susan Heller-Zeisler, NIST/IAAO</p>
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<p><u>CEOSE Designated Federal Officer – Executive Liaison</u> Dr. Wanda E. Ward, Office Head, Office of International & Integrative Activities, National Science Foundation (NSF)</p> <p><u>CEOSE Executive Secretary</u> Dr. Bernice Anderson, Senior Advisor, Office of International & Integrative Activities, National Science Foundation (NSF)</p> <p><u>CEOSE Scientific/Technical/Program Staff</u> Dr. Joan Burrelli, Science Resource Analyst Mr. Steven Buhneing, IT Specialist, NSF Ms. Vickie Fung, Program Analyst, NSF Ms. Geri Farves, Program Specialist, NSF</p>

Day One
June 19, 2014

Welcome, Introduction, and Opening Comments

CEOSE Chair, Dr. Wendy Raymond, opened the meeting with greetings, followed by the self-introduction of the CEOSE members and the Federal Liaisons. Appreciation was extended to Dr. Alexander Ramirez, the outgoing CEOSE Vice Chair, with special acknowledgement for planning the June 2014 meeting and facilitating the preparation of the recent and forthcoming biennial CEOSE reports to Congress. Dr. Raymond provided an overview of the meeting agenda and stated that the meeting theme was “Toward a Bold Initiative for Broadening Participation.” She commented that the bold initiative must emphasize institutional transformation and system change as well as provide the needed support to the populations and individuals from traditionally underrepresented groups in STEM. She announced that 1) Dr. Keivan Stassun will assume the leadership role for the production of the 2013-2014 biennial report, 2) new Vice Chair and full membership will be addressed by the next meeting, and 3) the October 16th meeting would be a virtual meeting. She emphasized the importance of the collaborative relationship with the Foundation as being highly constructive in advancing the broadening participation agenda for the nation. Members were also encouraged to be active in the dissemination of the CEOSE 2011-2012 report/handout.

NSF Executive Liaison Report

Dr. Wanda E. Ward, CEOSE Executive Liaison and Head of the Office of International and Integrative Activities (IIA), greeted the membership and other meeting attendees. She extended a warm welcome to new CEOSE member, Dr. Louis Martin-Vega and recognized the summer interns involved in NSF’s STEM Talent Development activities. Dr. Ward applauded CEOSE for their call for a transformative framework for broadening participation and efforts to disseminate to various stakeholders and STEM communities the BP messages discussed in the 2011-2012 CEOSE Biennial report. Other updates included the following.

- NSF submitted its annual report about direct support to minority-serving institutions (MSIs). In the aggregate, MSIs received a little over 5% of the NSF funding to institutions of higher education.
- The March BP update to Senior Leadership focused on NSF’s leadership role in STEM equity, diversity and inclusion. Challenges and Opportunities were framed and discussed in three categories:
 - Intellectually, that is, defining broadening participation for its intellectual merit in terms of diversity of thought; ensuring that key policies enhance rather than deter broadening participation; and promoting gender considerations in research content, design, and reporting.
 - Financially, drawing attention to the underreporting of the agency support to MSIs because the current reporting system does not capture sub-awards made to MSIs.
 - Organizationally, focusing on the need for NSF-wide BP metrics and routinely sharing best practice Foundation-wide.
- The BP discussions among the ADs have continued with BP as a topic for each of the recent leadership retreats. In the context of the strategic vision for inclusiveness, the April and June

retreats focused on addressing the BP grand challenge of underrepresentation, which is four-fold:

- Under-participation across demographic groups
 - Under-preparation for STEM careers
 - Under-resourcing contributing to growing group disparities
 - Under-production of a STEM workforce to ensure global competitiveness
- The Broader Impacts Infrastructure Summit was held April 16-18, 2014. The opening session with Dr. Nancy Cantor, Chancellor of Rutgers University-Newark, and Dr. Freeman Hrabowski, President of the University of Maryland, Baltimore County, emphasized the importance of the broadening participation agenda to advance science frontiers and to gain public support for STEM. In her first public NSF speech as Director, Dr. France Córdova stressed the broader impacts criterion in terms of helping fellow citizens to understand the relevancy of NSF investments and how the NSF portfolio is vital to the nation's future. Dr. Alan Leshner of the American Association for the Advancement of Science and member of the National Science Board directed attention to the need to be open to innovation from the field in addressing broader impacts and the need to shift from public communication to public engagement in explaining scientific investments. Members were encouraged to visit the meeting website (<http://www.broaderimpacts.net/index.php>) to view presentation slides.
 - The NSF Broadening Participation Working Group was reconstituted in early April and charged to develop options in response to the 2011-2012 CEOSE recommendation by June 30, 2014, and develop a new BP strategic framework for action by July 31, 2014.
 - NSF is one of six agencies involved in a review of women in STEM research—a study by the Government Accounting Office (GAO). The other agencies are: NIH, DOD, DOE, USDA, and NASA. The issues/key questions are: (1) What gender differences exist in the number of federal STEM research grant awards and what factors might explain these differences? (2) What steps do federal agencies take to comply with Title IX regarding federal STEM research grant recipients? (3) What additional actions, if any, do federal agencies take to address gender differences in STEM fields?
 - The Gender Summit 3-North America website, (<http://www.nsf.gov/od/iaa/activities/gendersummit/>) will soon have three additional documents: the conference report, *Diversity Fueling Excellence in Research and Innovation*, the full Roadmap for Action for North America, and Highlights from the Roadmap for Action for North America. On June 30, 2014, these documents will be released at the 4th Gender Summit-Europe in Brussels.
 - BIO is preparing a brochure to inform the BIO PI community about the ways they can work toward broadening participation. ENG is maintaining a listing of relevant STEM diversity conferences for outreach purposes. EHR is co-leading with NIH a subcommittee on diversity in response to the CoSTEM 5-Year Strategic Plan.

Discussion with ADs and Office Head

The panel consisted of Drs. Joan Ferrini-Mundy, Assistant Director for EHR; Farnam Jahanian,

Assistant Director for CISE; Pramod Khargonekar, Assistant Director for ENG; John Wingfield, Assistant Director for BIO; Joanne Tornow, Acting Assistant Director for SBE; and Wanda Ward, Office Head of IIA. The panel discussed recent and ongoing activities relating to broadening participation, including:

- the reactivation of the NSF broadening participation working group which should report on the results of their work by the end of June;
- CISE's national and regional collaborations of academic institutions, educators, professional societies, community organizations, and in many cases industrial partners, that serve as a national distribution point for best practices and educational resources and that advocate for inclusion of all students;
- SBE/NCSSES's data as a resource for broadening participation efforts, including working with EHR to look at the outcomes of the Graduate Research Fellowship program using the Survey of Doctorate Recipients (SDR), and a plan to greatly expand the SDR in FY15 to get finer grained information for employment outcomes by subfield, race, and gender (and in response to a CEOSE question, disability status as well as other attributes);
- BIO's Dear Colleague Letters mandating broader diversity and inclusion at BIO-funded conferences and workshops. An earlier version of the DCL mandated gender and age considerations; a more recent DCL included underrepresented minorities, women, and young, mid-career and later career scientists. They have been collecting data to see how effective that has been, and at least in the first year, it seems to be working.

CEOSE stressed the importance of providing data and evidence of impacts of NSF broadening participation efforts and asked about the two recent changes in the definition of disability in the Survey of Earned Doctorates that have made huge discontinuities in the time series data. CEOSE also expressed concern with the practice of including people with moderate disabilities in the definition which increases the size of the group.

Dr. Joan Ferrini-Mundi (EHR) addressed the notions of institutional transformation and systemic change and what might be learned from a variety of programs already here at NSF. She thought one productive line of exploration would be to think about what the policy shift would be by looking at programs like ADVANCE that promote institutional transformations and thinking about what we already have, what makes a difference, and what would need to happen going forward to transform institutional policies and practices. She also stated that the notion of systemic changes fits in with the notion of pathways rather than pipeline and the need to create flexibility and a range of ways into STEM for all groups.

Dr. Pramod Khargonekar (ENG) focused on the issue of scale-up, asking CEOSE to think about how the bold initiative could be structured in a manner that naturally causes scaling and dissemination. In engineering, scale up happens naturally but in broadening participation scale up seems to be very difficult. The discussion with CEOSE members centered on how to encourage scale up, given that NSF has only a few carrots and sticks. One suggestion was to leverage a network of beneficiaries and stakeholders that is built into the process and that helps disseminate and scale up.

Dr. Ward identified at least four key dimensions that need to be taken into account going forward: inclusion, relevance, scalability, and sustainability, and stressed the need to get more feedback on what might be some grand challenges in the diversity agenda that we might use to engage a variety of

stakeholders and that would better inform this bold new effort.

Inclusiveness and Equity in the Biomedical Research Enterprise

Dr. Hannah A. Valentine is the recently appointed Chief Officer for Scientific Workforce Diversity at the National Institutes of Health. Her presentation addressed the importance of diversity, the underrepresentation problem and challenges, and programmatic efforts. She commented that diversity is a social equity issue and is an imperative to maintain a competitive edge as a nation in advancing science and innovation. She shared data to demonstrate that the nation is not drawing from its entire intellectual capital to address the complexities of science today, asserting that the complexities of the human health and diseases that we seek to solve will require that diversity of perspective that will come when we ensure that we have broad participation. She pointed out that when students do not see others like themselves when they look at career trajectories, they are less likely to have the resilience to be able to persist when faced with some of the challenging issues of continuing in the program. Therefore, it is essential to have diverse representation at faculty and leadership levels so that students from underrepresented groups can identify with STEM careers. She also stressed the importance of changing the culture, focusing on the need to address implicit bias and stereotype threat. In sharing a suite of interrelated diversity programs at Stanford, Dr. Valentine emphasized bridging the gap between undergraduate and graduate education, mentoring and networking, and the development of novel approaches that really go beyond what has already been tried. She also described three aspects of NIH Transformative Diversity Initiative: enhancing the diversity of the NIH-funded work via NIH Building Infrastructure Leading to Diversity (BUILD), National Research Mentoring Network (NRMN) and Coordination and Evaluation Center (CEC); increased engagement by all NIH leadership; and ensuring fairness in peer review.

In her role as Chief Officer for Scientific Workforce Diversity, Dr. Valentine commented on the following challenges: breaking down silos to increase trans-NIH communication/interactions, promoting transparency and data accuracy, identifying and disseminating evidence-based best practices, and aligning the changing nature of science with the current culture. Short term goals include: enhance diversity in applicant pools, provide resources for hiring the most talented, create a systematic outreach process, and develop a program to create the climate of belonging.

Updates from the Federal Liaisons

CEOSE received broadening participation reports (verbal and/or written) from the US Department of Agriculture (USDA), the Department of Education (ED), the National Institutes of Health, Environmental Protection Agency (EPA), and the White House Initiative on Historically Black Colleges and Universities. Issues discussed in this session included: interpreting statutory requirements for diversity programs, increased diversity of STEM careers in the federal sector, working collaboratively as NSF focuses on broader impacts and NIH focuses on enhancing diversity, expanded STEM capacity for MSIs, budgetary trends and implications of direct support to underrepresented students (e.g., financial support) vs. diversity support via research and development efforts.

Reports by CEOSE Liaisons to NSF Advisory Committees

A common theme across the directorate AC reports was the need to focus on the more strategic approach(es) to broadening participation within STEM fields. SBE was applauded for asking innovative BP questions and ERE for wanting BP to be the core element of broader impacts. CEOSE

members noted that in advocating for an institutional-wide approach to BP, it will be important for each field to figure out how best to deliver BP cultural change within an institutional environment. Other suggestions for refining the message of the bold new initiative included: point out what is bold and innovative, indicate what the proposed initiative would be doing that is not being implemented already, and be more concrete in visioning the new bold initiative. Another suggestion for a future agenda item was a presentation on virtual panels. Members were also reminded that along with the bold new initiative that this is a great opportunity to encourage a more diverse NSF scientific workforce. There was overall agreement to advance the BP dialogue by discussing grand challenges for broadening participation.

Day 2

June 20, 2014

Opening Remarks/Discussion

Dr. Raymond, CEOSE Chair, opened the meeting and reviewed scheduling changes and the overall strategy for the second day. The members agreed that it was important to frame the discussion with the NSF Director around the 2011-2012 recommendation, acknowledging the important dialogue that had taken place with the leaders of the NSF Directorates and IIA Office. Members also stressed the importance of strengthening the collaboration across the Federal agencies to support diversity in STEM and reiterated the Committee's own desire to not be at risk of working cross-purposes with the Foundation's broadening participation agenda.

Session with Congressional Staffer

Maisha Leek, Chief of Staff for Congressman Chaka Fattah, (Ranking Minority Member of the House Subcommittee on Commerce, Justice, Science, and Related Agencies) expressed interest in the most recent CEOSE report, liked the idea of one clear recommendation, and provided encouragement to CEOSE for its work. She thought the biggest challenge for engaging Capitol Hill and the public is the idea of what quality preK-20+ STEM education looks like, which has not really taken root in the public's and her colleagues' minds. She thought that CEOSE needed to communicate the urgency of the situation to Congress and the public and noted the need to include chambers of commerce and the spinoff companies, tech transfer offices at universities in this conversation.

CEOSE asked whether they should keep the recommendation at the broad vision level or drill it down a bit more concretely. Leek responded that they should be leaders, stay with the bold language and not get bogged down too much in the details. She stated that it is easier to mobilize and motivate with a singular sentence and bold language. She also thought that the number one challenge is for quality STEM education and outcomes in order for the US to be globally competitive. She thought CEOSE should emphasize teacher training in STEM and math fields and building partnerships between universities and preK-12 that include dialogue on how to prepare students for college level math and science and how to provide pathways for students into STEM. Leek's key recommendation to CEOSE was to advocate for diversity in STEM that is all inclusive.

Discussion with Director and Deputy Director

Dr. Wendy Raymond thanked Dr. Córdova and Dr. Marrett for coming and expressed a desire for conversation about the CEOSE 2011-2012 report and the bold initiative they recommended. The initiative calls for institutional transformation at NSF and beyond and also focuses on who we are serving--women, persons with disabilities and people from underrepresented minority groups. CEOSE hopes that NSF will take a leadership role that includes other agencies and includes a pathway approach for preK-20+. She stated that one of the next steps is to collaborate with people at

NSF to actually articulate a number of grand challenges that might help move this bold initiative forward.

Dr. Córdova expressed a need to get more detail about the recommendation, including more detail about why CEOSE thinks this particular approach will work and what the added value is. She would like to get the thinking of CEOSE, the thinking of the broadening participation working group, and put those two thinking groups together to move forward with broadening participation, both within NSF and in the broader STEM community.

CEOSE members said that they see NSF's role as the intellectual catalyst or enabler. They emphasized the importance of building on successes, taking it to the next level, and emphasizing the notion of pathways in a broad and extensive way, which means thinking in integrative ways of bringing activities together; partnering with and engaging universities, schools and their communities; and not forgetting the individual focus. The NSF role is to foster intellectual activities, implementation and foundational research that move this approach forward and that can be scalable. That means creating activities that can be scalable and that encourage scalability based on successes, based on the creation of pathways, based on successful individual support, and based on effective partnerships and networks. CEOSE members stressed the need for accountability of universities to ensure participation by all groups and they want NSF to require institutional transformation and to provide the carrots and sticks to ensure accountability.

Dr. Marrett expressed the need to look at the entire NSF broadening participation portfolio and said that the BP working group will help us sort through what we have learned. NSF needs help from CEOSE to figure out what kind of framework is needed and how to move beyond focused and emphasis programs to address different levels, schools, out of school experiences, and pathways. NSF needs help in achieving a more integrated framework to move forward. She also emphasized the need to integrate for partnerships from the very beginning for scalability and for leveraging resources.

Dr. Córdova asked CEOSE to think about what is the one best thing that NSF can do to increase participation in science and engineering. She also commented on the need to involve students in experiences that will enlighten them and encourage them to become scientists and engineers. She stated that we are losing the ground that the United States has long held as a leader in the sciences, particularly STEM. She sees NSF's role as providing the leadership and the structural organization to enable other agencies to coordinate and to facilitate their efforts to move this national effort forward.

Science of Broadening Participation Panel

The panel consisted of Drs. Carlos Rodriguez, retired from American Institutes for Research (AIR); Brenda Major, University of California-Santa Barbara; Cheryl Kaiser, University of Washington; and Terrell Strayhorn, Ohio State University.

- Dr. Rodriguez, a former Principal Research Scientist and Senior Advisor, pointed out that broadening participation is a national imperative: women represent a larger proportion of the US population than men and 54 percent of the population will be minorities by 2050. Given this shifting demographic landscape, cultivating from a broad pool of potential STEM expertise will enable the US to develop STEM human capital from within and will strengthen the US national security interests, our economy, and our quality of life. He led a study supported by NSF in response to a Congressional directive to solicit recommendations and feedback from a range of stakeholders with expertise on effective mechanisms to increase the

recruitment and retention of members of underrepresented groups in STEM fields, and the attainment of STEM degrees by underrepresented groups. He shared the following feedback received from stakeholders: expand the definition of success to assess degree program quality, instructional quality, and value of degree earned; account for institutional differences and measure change over time on key indicators; include accountability criteria in RFPs and reward institutions that meet or exceed accountability standards; expand two-year institutional capacity to: 1) remediate academically underprepared students for STEM coursework and 2) successfully transfer students to four-year STEM degree programs; expand the capacity of minority-serving institutions to: 1) establish/maintain STEM research and institutional capacity, 2) prepare students for STEM graduate education and STEM academic careers, and 3) lead/contribute to scientific innovation; improve within-school community building and engage students in STEM research throughout their undergraduate experience; provide faculty development in the areas of mentoring, cultural competence, community engagement and outreach, etc.; align STEM degree preparation with workforce needs; promote the cross-fertilization of faculty and course development across STEM and non-STEM disciplines; and train STEM students to be creative and innovative entrepreneurs.

- Dr. Kaiser, Associate Professor of Psychology and Dr. Major, a Social Psychology Professor, focused on research that addressed prejudice, discrimination, and devalued social identities. In their discussion of “Illusions of Fairness: Ironic Effects of Organizational Diversity Initiatives, they called attention to an analysis of over 30 years of data from over 700 US organizations that revealed that most diversity initiatives do not make companies more racially or gender diverse. Using data, it was also pointed out that types of diversity initiatives that have positive effects on the percentage of underrepresented groups within organizations like mentor programs, diversity task forces or diversity managers are the efforts that are least likely to be implemented in an organization. These researchers have conducted studies to investigate the following question: Could the mere presence of diversity initiatives blind people to seeing discrimination against women and minorities even when it clearly exists? The two implications from several studies they shared with CEOSE were: 1) organizations need to be aware of the potential for discrimination, even when the organizations is making progress toward diversity and 2) the diversity conversation should shift from showcasing diversity initiatives to showing accountability and effectiveness of diversity initiatives. An increased focus on using evidence-based approaches to manage diversity requires investing in figuring out what works to make diversity more scientifically and empirically grounded.
- Dr. Strayhorn, Professor of Higher Education, stated that there are economic gains for the nation in terms of broadening participation because the underrepresented groups are interested in innovation, creativity, and exploration. He has a research portfolio of correlational and experimental studies spanning the broadening participation spectrum of investigating barriers to access, learning and success; understanding factors that hold promise for either inspiring interest in learning or broadening access and success; and studying persistence to degree and entry into the STEM workforce. Dr. Strayhorn discussed the loss of interest in STEM and the importance of connecting students aged 8 to 15 to professional identities as scientists and engineers in the context (with evidence) that role models and engagement do matter. His research revealed the importance of addressing all three components of engagement, at multiple education levels, to promote diversity in STEM: the behavioral form of getting students involved in their own learning, the cognitive form of what student think about when they have become engaged in STEM activities, and the emotional form of a sense of belonging. It was pointed out that the sense of belonging [in a STEM career] must be satisfied continually with changing circumstances, conditions, and contexts.

CEOSE Messaging and Marketing Update and the 2013-2014 Biennial Report

The Chair noted that the CEOSE cover letter and handout had been sent to over 120 organizations. She also thanked the three members who had submitted the names of additional individuals and institutions to receive the mailing. Members shared the various meeting where they could discuss the 2011-2012 CEOSE report/recommendation handout. Additionally, members agreed that the cover letter needed to invite other organizations to engage their communities in the work of broadening participation to help advance the agenda that CEOSE is pushing. The Chair will add a sentence or two to the cover letter for members to use in their dissemination efforts of the recommendation handout.

Dr. Keivan Stassun agreed to have oversight for the 2013-2014 biennial report to Congress. Drafts of the first three sections were distributed. The last section of the next report will focus on some grand challenges of broadening participation, e.g., under-preparation, under-participation, under-resourcing, and under-productivity. An important question is: Who is driving diversity? This concern needs to be discussed in the context of policies facilitating or hindering broadening participation. This idea may be developed more fully in the 2015-2016 report.

Increasing Hispanic Participation in STEM Panel

The panelists for the discussion on increasing Hispanic participation in STEM were: Dr. Ann Gates, University of Texas at El Paso; Dr. Sylvia Hurtado, University of California, Los Angeles; Dr. Alicia Dowd, University of Southern California; and Dr. Carlos Gutiérrez, California State University, Los Angeles.

- Dr. Gates, Professor and Chair of the Computer Science Department, focused on the Computing Alliance of Hispanic-Serving Institutions (CAHSI), a network of partnerships and collaboration that increase the number of professionals who enter the computing workforce, support the retention and advancement of Hispanic faculty and students in computing, and develop and sustain competitive education and research programs at HSIs. CAHSI has three key strategies: promote dialogue for resource sharing and expanding opportunities, endorse a social science network to employ evaluative thinking and promote information dissemination, and deploy field-tested strategies for students at critical stages in the academic pipeline that result in systemic academic initiatives. One of the important data points of CAHSI's success was that CAHSI graduates Hispanic students at nearly 10 times the national rate of Hispanic baccalaureate degrees in computing. She stated that CAHSI's engagement with corporate America provide the opportunity for industry to influence professional development, education, and training across institutions. She emphasized that CAHSI is successful in building students experiences that 1) foster a sense of community around excellence in the field, 2) focus on skills and knowledge development to succeed and advance in computing careers, and 3) stimulate aspirations for advanced computing degrees.
- Dr. Hurtado, Professor and Director of the Higher Education Research Institute, reported on mixed-method research designed to understand the role of introduction courses, efficacy of interventions, best practices in STEM, institutional differences and academic major context, and student pathways to graduate school. She shared findings on first-year retention for underrepresented students in the biomedical and behavioral sciences (BBS), pointing out that climate issues impact student sense of belonging and managing academic adjustment and that joining a pre-professional/departmental club increases the odds in BBS retention. She shared data that showed that about 30 percent of Latino STEM majors will complete their

undergraduate studies in six years and that Latino STEM majors tend to go to a two-year institution at some point in their career preparation. Findings on four-year STEM retention for underrepresented minorities revealed that higher odds of STEM persistence were related to the following: joined student organizations related their major, discussed course content outside of class, participated in undergraduate research programs, entered college with higher SAT scores and attended an institution with a higher concentration of STEM students. Underrepresented students had lower odds of completion in STEM if they worked full-time, initially aspired to earn a medical degree, or attended a more selective institution. Latino/o degree completers in six years were more likely to finish in STEM, compared to non-STEM majors, when they had higher academic self-concept, higher high school grades, mothers with a higher level of education and intended to major in engineering as compared to biological sciences. Drawing on qualitative research, Dr. Hurtado stressed the need for a culture of competence recognition and performance opportunity. She also reported that URM STEM majors had lower odds of enrolling in graduate school if they relied on personal funds to finance their senior year of college, completed college with higher amounts of student loan debt, and indicated that they had come to college to be able to make more money. Additionally, initiatives that hold high promise for graduating Latina/o science majors require more institutional development and resources. The recommendations for practice were: create academic bridge programs and research programs to help Latinos increase mathematics and science proficiency and further develop STEM interest and competencies; and enact pedagogical innovations in introductory classrooms (e.g., student-centered pedagogy and team learning). Institutions should make authentic undergraduate research experiences more broadly available, reduce student financial obligations, encourage faculty mentorship, and provide peer learning support.

- Dr. Dowd, Associate Professor and Co-Director of the Center for Urban Education, highlighted community colleges as a route to STEM degrees: about 60% of Latinos in higher education are in community colleges and 44% of all STEM Bachelor's degree holders attend community colleges at some point in their career. She underscored that resource inequities contribute to STEM disparities for degree completion. She also discussed research that pointed to campus climate as another key issue, identifying faculty as the source of change and re-emphasizing the NSB's human capital recommendations: provide opportunities for excellence, cast a wide net, and foster a supportive ecosystem. Dr. Dowd briefly described the equity scorecard and a legacy of legal racial discrimination in education (e.g., stratification, deficit assumptions). Using mixed method, case study research, her research team has studied the types of institutional support that STEM faculty and program administrators provide to Latino students, ranging from direct support to integrative support to systems development to system linkages and networking support. CEOSE members were encouraged to explore the STEM Toolkit: Tools for Increasing Latina and Latino STEM Baccalaureates (http://cue.usc.edu/tools/stem_focus.html). She shared the Stanton-Salazar's social capital framework about the roles of institutional agents in the empowerment of low-status students and youth. She also stressed the importance of creating networks to support students and to conduct design-based implementation research. She pointed out that developmental evaluation should be coupled with implementation research to better understand the kinds of changes that need to happen and the best ways to support innovation. This approach is a better assessment of the emergent process wherein the intervention takes shape as understanding increases. Dr. Dowd ended her presentation with the call for teaching and doing research in new ways (e.g., action research methods for understanding the influences of faculty and structural changes related to the curriculum, upgrading processes, and selection criteria) and the comment, "equity in education would be an empty promise without excellence."

- Dr. Gutiérrez, Professor of Chemistry, also emphasized the value of cognitive diversity to science in his presentation of minority opportunities in research (MORE), preparing students for success in STEM PhD programs. He stated that the answer to the question of who is going to be doing science and engineering in 2050 is all of us (because there will be no majority group in the US). MORE is an umbrella organization of externally-funded STEM programs at California State University, Los Angeles, designed to produce students who will assume leadership positions in American science. The program has a well-established tracking system of PhD admission and completion of its students--25 students beginning PhD program in Fall 2014, 130 alumni in PhD programs, and 94 having completed the PhD in the last seven years. Knowing the attributes and characteristics of successful PhD students and what it takes to move motivation to excellence, the components of MORE are: attention to academics, research training, travel to professional meetings, academic and career advisement, weekly seminars, workshops, and publication and presentation of research results. The program evaluation, using propensity matching, revealed better outcomes for MORE undergraduates and graduates in terms of GPA at graduation, time to degree, persistence in STEM, and PhD admission. Dr. Gutiérrez discussed the following suggestion for promoting equity and excellence: develop appropriate science curricula and pedagogies; create a campus climate that fosters success and excellence in all students, and provide all students with sufficient protected time for them to achieve excellence. He asserted that we know what to do to bring about change. Teach science the way we do science. Research (or research-like) experiences can be intentionally imbedded in all (or most) courses, with increasing sophistication over an integrated freshman through senior curriculum. Model for students how scientists and engineers think. Minority students are not broken; therefore stop negative reinforcers of underachievement and underperformance that put students at a psychological disadvantage. Recast financial aid as an investment by taxpayers in student success and the future of the nation. Moreover, he shared with CEOSE the perspective of not being satisfied with current accomplishments but to be more successful keep challenging our assumptions. He further commented on the institutional commitment to achieving an institutional culture for more meaningful integrated approaches where we are valuing diverse talent and preparing all students to be successful in STEM.

Announcement, Final Remarks, Adjournment

A suggested agenda item for the next meeting was a presentation from the NSF Broadening Participation Working Group. Other suggestions for future meetings were to invite presenters from professional societies to discuss evidence-based approaches/strategies, have a discussion of broadening participation opportunities for large facilities, have a presentation on the annual merit review report and include insights from pilot efforts like virtual paneling, have deeper discussions about transformation and sustainability, and continue the dialogue with the Assistant Directors.

A summary of Dr. Ira Harkavy's comments to NSF Assistant Directors was distributed. There was a reminder to draft grand challenges before the October meeting and maybe frame the future report around the grand challenges or big issues. Members accepted assignments for completing the draft 2013-2014 report by August 15, 2014.

The Chair adjourned the meeting after reminding members that the next meeting will be a virtual meeting, scheduled for October 16, 2014.

