



COSSA

## Washington Update

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# COSSA ORGANIZES ENHANCING DIVERSITY IN SCIENCE RETREAT

Led by COSSA, on February 28, nine organizations held a disciplinary-wide retreat of professional associations and scientific societies to discuss the role of these organizations in *Enhancing Diversity in Science*. The organizations responsible for conceptualizing and implementing the groundbreaking meeting included: AAAS Center for Careers in Science and Technology, the American Educational Research Association (AERA), the American Sociological Association (ASA), the American Psychological Association (APA), the Association of American Medical Colleges (AAMC), the Federation of American Societies for Experimental Biology (FASEB), the Institute for the Advancement of Social Work Research (IASWR) and the Society for Research in Child Development (SRCD). The National Institutes of Health (NIH) provided the bulk of the funding with additional resources from the National Science Foundation (NSF).

The retreat, in part, was a response to the recent number of reports that have documented how increasingly fewer underrepresented minorities are pursuing careers in science, and that the leakages in the science pipeline for minority students and professionals happen at various stages - but especially within higher education. Professional associations and scientific societies represent permanent homes for scientists and students of science, many of whom relocate several times throughout their careers. In addition, associations and societies, as sources of stability for their members, have an opportunity to provide educational and career support that might not otherwise be consistently available. They can work together to develop common approaches to enhancing educational and career opportunities for vulnerable populations, and to help ensure greater participation of underrepresented minorities in science.

The goal of the session was to spawn *collaboration* among associations, societies, federal agencies, and private foundations that has been, in many instances, lacking. The conveners of the retreat believed that collaboration is essential to enhancing recruitment and retention of underrepresented minorities in science.

The associations and societies hoped that the meeting would forge new opportunities for these groups to work together, learn from each other, and develop common approaches, where appropriate. In turn, the group effort should enable key areas of progress, such as the development and utilization of outcome measures to assess program effectiveness.

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The retreat's agenda focused on: (1) Obstacles and Challenges to the Recruitment and Retention of Underrepresented Minorities in Science, and (2) Successful Models and Future Initiatives. Shirley M. Malcom (AAAS) kicked off the morning by framing the issue. The morning panel of experts: Arthur L. Coleman (Holland & Knight), Erich D. Jarvis (Duke University), and Andres E Jimenez (University of California) focused on understanding the various obstacles, challenges and opportunities in this area, including those identified in research, in recent court decisions, in the careers of individual scientists, and by university and association leaders. During lunch, NIH Deputy Director Raynard S. Kington provided remarks about the NIH's efforts in this area and introduced the retreat's keynote speaker, Freeman A. Hrabowski, III, President of the University of Maryland, Baltimore County. The afternoon panel of experts: Wanda E. Ward (NSF), Jeremy M. Berg (National Institute of General Medical Sciences), Ted Greenwood (Alfred P. Sloan Foundation), and Joan Y. Reede (Harvard Medical School) focused on successful models for overcoming obstacles, drawing upon the perspectives of both federal and private funders and program leaders. Mary Ann McCabe (SRCD) shared the key findings of a recent survey of professional associations and scientific societies that indicate what associations are doing now, what goals are being sought, and whether/how outcomes are being measured.

COSSA Executive director Howard Silver welcomed the retreat's participants, noting that "as you all know by your presence, this is an extremely important topic." Silver noted that he had spent the previous two days "up on Capitol Hill at hearings on the budget for the National Science Foundation, and probably 75 to 80 percent of the discussion was based around the notion that China and India were spending significant proportions of their GDP on scientific research and building a scientific workforce." As we know, he continued, China and India have over 1.2 billion people compared to the United States at a little over 300 million people. If you believe that demography is important, and since we're a social science association, we believe demography is important, this creates difficulties for the United States." Therefore, he added, "it's very important that we don't waste any talent we might have. It's imperative to make the idea of enhancing diversity in science work."

### 'Building a Diverse Talent Pool for STEM: Finding Clarity Amid the Clutter'

Malcom's presentation, entitled, "Building a Diverse Talent Pool for Stem: Finding Clarity Amid the Clutter," started the day by framing the issue in a way that "was sufficiently honest, candid, and that could kind of cut through the noise" so that participants could begin "to get at what was really at the bottom" of the issue. "It is essentially about getting the assumptions right," she noted. The first issue is that we do not have a shortage of scientists in the U.S. and according to economists we probably will not, observing that the much-discussed Harold Salzman (The Urban Institute) paper does "not pertain to underrepresented minorities.



The second issue is many people think that these populations are the United States' "ace in the hole, although they are not necessarily viewed that way," she stressed. Malcom noted that the reality is that the demographics are moving in the direction the United States will soon have a very sizeable proportion of our college age population coming from groups that have not had a strong attachment to science and engineering fields. She observed that another concern surrounding the question about diversity is, "what is the value added?" What do we gain by having diverse teams? What do these diverse perspectives allow us to do and accomplish? How do they let us see the world in ways that we can in fact participate in a global community on a much different kind of a plane? "I think that those are the kinds of directions and questions that maybe we need to pursue," she posited.

Another issue is getting the targets right, Malcom stated. She observed that a lot of time has been expended trying to fix the students instead of trying to fix the system, noting that the population of our universities now, including our research universities, are made up of upwards of 62 percent female of all races and minority males. There is also the issue of “finding the high leverage parts of the system.” Where do you begin, she asked. A lot of studies have suggested that research participation really helps to clarify and solidify career goals. “So we have an opportunity there,” she argued. We also have to begin to understand the points of transition and whether or not there is real clarity among all the people who are in the line of transition about what their roles are and how they can accomplish them. Malcom also noted the possible legal obstacles surrounding these issues. She said that the University of Michigan is owed a debt of gratitude because “were it not for that kind of clarity . . . we would not think we could do anything.”

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Another focus, Malcolm declared, is getting the strategies right - looking at the research, using data to inform our efforts. “There is such power to being able to really understand where we are losing people, and who we are losing.” She cautioned, however, that we also have to be “very concerned about the data” we are beginning to lose. Without information, we have

very little sense of what it is going on. This is one area where professional societies can assist. Societies who collect data can begin to help make sure we have the kind of information we need to define the tasks ahead.

Incentive structures are also important; “What you incentivize is what you get,” Malcom observed. Right now there is a lot less emphasis on mentoring and similar activities within our universities because there is not a reward for doing these things. You get rewarded for bringing in grant money and for publishing papers; you are not rewarded for doing right by students in terms of their undergraduate courses. Malcom suggested that this is another role that professional associations and scientific societies can uniquely play.

Noting that she has basically lived in a professional society for 30 years, Malcom maintained that there is “a power to leadership of the professional societies that is absolutely undeniable. You can reset the value structure. You can help to legitimize things that would otherwise be seen as tangential to the work of a chemist or whatever you may happen to be. Societies can provide resources and training.” She emphasized that when she says resources she does not mean that you are giving out grants. There are more resources than grants, including setting up mentor programs, connecting people, providing opportunities for networking, providing information on where people can go to get support, and leadership training. Malcom emphasized that these resources also include affecting and informing policies. Finally, we need to recognize and celebrate when people do things right.

### Hrabowski: We Have Not, When Thinking About Training, Given the Level of Rigor to the Evaluation That We Do to Science That We Really Care About

President of the University of Maryland, Baltimore County, Freeman Hrabowski, III, was the retreat’s keynote speaker. He is also the chair of a new committee for the National Academies on minorities in science, examining broadening participation, particularly for underrepresented minorities. It is a complement to the NAS’ *Beyond Biases and Barriers*’ (see *Update*, [June 25, 2007](#)) committee that focused on women. These committees, Hrabowski explained are the result of congressional action since the publication of *Rising Above the Gathering Storm*. That report “did not speak to the question of under representation.” The newly formed committee on minorities’ intent is to “add value” and not “simply regurgitate what has already been said.”

According to Hrabowski, what he would say about the science enterprise in general is that “we have not, when thinking about training, we have not given the level of rigor to the evaluation that we do to science that we really care about. We still think about the training of people as something that’s warm and fuzzy.” Accordingly, Hrabowski noted, that when you look at the recommendations, “you will often see we either do not have the data or we cannot analyze it in a way we need to... Those of you in these organizations, I know, appreciate what I am saying.”

Hrabowski noted that in 1946, Albert Einstein, in a paper called *The Negro Question*, noted that “a large part of our attitude towards things is conditioned by opinions and emotions which we unconsciously absorbed as children from our environment. In other words, he explained, it is tradition, besides inherited aptitudes and qualities, which makes us what we are. But we rarely reflect how relatively small, compared with the powerful influence of tradition, is the influence of our conscious thought upon our conduct and convictions. Of course, it would be foolish to despise tradition, he acknowledged, “but with our growing self-consciousness and increasing intelligence, we must begin to control tradition and assume a critical attitude toward it if human relations are ever to change for the better. We must try to recognize what in our accepted tradition is damaging to our faded dignity and shape our lives accordingly.”



“Setting that context, which says that we make assumptions all the time about how to do this work,” Hrabowski noted that the one thing that helps his campus to be successful, is that they are always questioning themselves. What is it that they have not thought about? What assumptions are they making that are not necessarily valid? How should the university rethink how it is doing things? Hrabowski challenged the scientific community to think about that in particular. He related the story of when he was a young vice-provost he was challenged by Ted Greenwood of the Sloan Foundation, who asked some very good questions that “frustrated” him to no end. He acknowledged that the questions were right on the mark because he had not seen an institution, particularly predominantly white institutions, like UMBC, that was successful in producing large numbers of African Americans in particular, or Hispanics, who would go on to get Ph.D.s in science and engineering. He pointed out that he is still “hard pressed” to find it.

According to Hrabowski, Greenwood’s questions forced him to go back and ask the hard questions of his campus. What are we going to do? How do we change the culture? How do we get people to understand it’s not really the case than only an M.D. is a real doctor?

### NIH Struggles with How to Create a Diverse Workforce

According to NIH Deputy Director Raynard Kington, “one of the issues the NIH continues to think about and struggle with is the exact topic that is the focus of this meeting, how can we assure that we have a diverse scientific workforce.” He observed that perhaps the strongest motivator for “many communities that don’t necessarily have religion on this topic yet is the demographic imperative.” Using Census Bureau data of race and ethnic distribution of 18-year olds in the United States in 2000 which shows that more than 40 percent are non-white and either Hispanic of any race, or African American, or Asian, or other, including mixed races. That pattern over the next 50 years has been a strong motivator for organizations to try to understand what the likely impact of this distribution will have on our scientific workforce in the next generation,” he explained.

Kington presented a “sobering set of statistics” from the NIH that reveals that the percentage of principal investigators of research project grants, or most of the investigator-initiated (R01s), who are African American has not ever topped two percent, and has hovered between 1.3 and 1.8 percent



between 2000 and 2006. The numbers are somewhat better for Hispanics, Kington explained, but there are “no strong trends in an upward direction.”

According to Kington, the NIH is attempting to use their data to try to understand what might be driving the patterns the agency sees. He noted that in the middle of the doubling of the NIH budget, there was a significantly lower success rate for African Americans when compared to either white applicants or Hispanic applicants. When stratified by the institutions’ rank in terms of dollars they received from NIH, the disparity actually increases dramatically as you go down that ranking, he pointed out. From the NIH’s examination of where the applications were coming from, Kington noted that the agency found that interestingly enough, African Americans, in particular, were “much more likely” to submit

applications from institutions that are at the bottom of the ranking in terms of receiving funding from the NIH. “So we have the combination of institutional effect across institutions, and the disparity increasing as you go down institutional rankings,” he explained.

What the NIH has learned from this, Kington reported, is that perhaps the agency needs to do more analyses of its own records and data to understand some of the patterns it is seeing that might inform how the NIH develop interventions to improve success rates, particularly for underrepresented minorities. He also reported that there are a lot of ongoing activities at NIH addressing “many issues related to the workforce.” He recalled the National Research Council report that specifically assessed the NIH’s training programs. He informed the group that NIH is developing an agency-wide response to those recommendations. He also observed that the agency is also devoting more resources to developing models of understanding the workforce, which he noted has turned out to “be more complicated than initially anticipated.” Kington also noted that the NIH was planning a workshop with FASEB, the AAMC, and the Sloan Foundation, to examine the broad issue of the biomedical research workforce. One area of particular interest, he explained, is how changes in labor market diversity will affect the NIH’s success in achieving the distribution necessary to have a successful scientific funding program.

Like Malcolm, Kington referred to the significant legal challenges that will need addressing. The NIH is devoting more resources to developing the “compelling interest” case. Working with other federal agencies and in the context of demographic shifts, the case can be made, he declared.

### **‘Singularly Among the Challenges Colleges, Universities and Professional Schools Face Today Is Leadership on This Issue’**

Arthur Coleman of Holland & Knight offered his perspective with respect to access and diversity issues with an institution-specific focus, designed to give the representatives of national organizations and foundations insight into the challenges institutions face. He also shared opportunities that have presented themselves. A former Deputy Assistant Secretary for Civil Rights in the Department of Education where he was responsible for policy and enforcement on this issue, since 2000 Coleman has been a consultant to colleges and universities and national organizations.

Coleman suggested that organizations and institutions “remain too much in our own worlds” with stovepipe decision-making that leads to isolation. He emphasized that his overarching concern is that “if we don’t have a truly authentically mission-aligned, integrated, and holistic system of policy development by which the institution comes to terms with what does diversity mean for me, how important is access, including, but not limited to, access for underrepresented minorities. How important is that to me? Then within different strands - medical schools, engineering programs and the

like - what uniquely do we need to be doing to tap these goals? We are missing the proverbial foundation that will get us to yes, both educationally and legally."

Having learned from his experience working on these issues, Coleman explained that the single hardest question and the one that is critical over the long haul is to be attuned educationally and legally to what is success and how do you know it when you see it. According to Coleman, "singularly among the challenges colleges, universities and professional schools face today is leadership on this issue." Diversity is always number six on the list and we've got time to do the top five. We've got to find avenues and tools and points of leverage that will ensure that the issue gets the attention it merits.



Coleman argued that we have "a window of opportunity to get it right." In the wake of the four court cases decided in the last five years, we know more than we did previously. He observed that there is a growing consensus regarding the need to address the achievement gap and pipeline issues with a focus on science. If we are not taking advantage of the potential linkage we can make with that recognition from an international competitiveness standpoint, he argued that we are missing the beat. From a policy development standpoint, Coleman lamented the inability to connect research with practice. The research needs to be framed with an eye toward what's working, what's not, and where the challenges are. We need to highlight what's replicable, what's scalable, and the context in which the research is generated, so that institution-wide we can look at the data and know whether they are a likely fit, he concluded.

### 'Diversity Breeds Success'



Erich Jarvis, a recipient of the newly created NIH Director's Pioneer Award among numerous other awards, shared a personal perspective of his transition to becoming an independent investigator. Born in Harlem and raised in New York City, Jarvis explained that he comes from a low-to-middle class family. He noted that one thing he realized that helped him become a scientist or whatever he decided to do was a lot of "psychological support" in his family to challenge yourself, to "do something that has a positive impact on the world, and be ambitious at it if need be." That psychology has remained with him until this day, he insisted. According to Jarvis, "most underrepresented minorities coming through the sciences today or any kind of high-profile career need some kind of support like that."

Trained as a dancer, Jarvis described how he made the transition to science at the end of his high school years because he wanted to do something that would have a positive impact on the world. He thought he could do more as a scientist than as a dancer. He noted that people often ask him how he made the switch, given that the two are not thought of "as comparable careers." Jarvis explained that he discovered that the discipline he learned as a dancer, the kind of training and hard work and the practice until you get it right, because you fail a lot of times, was actually very useful, and in some ways almost essential for his path to becoming a scientist. In the context of the panel, he noted, the point "is that for many underrepresented minorities it doesn't mean that you have to be pursuing the fields in science in your early years in order to actually then end up having a successful career."

For Jarvis, it was as an undergraduate at Hunter College that he began pursuing a science career. He shared that he majored in both math and biology because he was indecisive as to which he liked more. He added that at the time he thought that being a mathematician would help him think logically. Another element Jarvis noted was that his instructors were nurturing and he did well as an

undergraduate -- producing six papers from his undergraduate research. He described applying to graduate school as "the strangest experience" of his life. Having "pretty decent" GRE scores, the six papers and his skin color, he was highly recruited. He related that he had people suggesting that if he did not attend their university they would not have any African American students. He pointed out that he was not talking about the 1960s, but that he was the recipient of these "unintended racial remarks," as recently as 1989 and 1990. Jarvis explained that he began to internalize these negative opinions until he realized that yes, he had talent, ambition, but at the same time he would have not been able to realize his accomplishments without the programs. He acknowledged his amazement when he realized that some of his classmates actually received new cars as graduation gifts. So, thereafter, even going into his faculty position, he realized that the color of his skin would rarely be neutral. It would be a disadvantage or an advantage.

To deal with this realization, Jarvis explained that he now has two jobs: 1) being a scientist and 2) trying to cure society's disease, the issue the retreat was addressing. Because of the color of his skin, he related that he gives the second job even more of a priority than the first job. He acknowledged that he has received some negative feedback from representative students who feel that he should lead by example, rather than being an activist. He agreed with the other speakers that we have to convince people that the reason to have diversity is that "it actually breeds success."

Jarvis observed that the people that have come through his lab have been more diverse than the people who come through other labs at Duke. While it happens naturally, he explained, it is also indicative of the way he thinks. He shared that he believes that diversity is not only about your ethnicity and your cultural background, it is also in the way you approach science. Highlighting his genealogical makeup, Jarvis noted that his views about science are likewise diverse. His lab combines molecular biology with anatomy, with physiology and biomathematics and so forth.

### **Individuals of Latin American and Mexican Origins Are Severely Underrepresented in Ph.D.s and Professional Degrees**

Sharing his own background, Jimenez explained that his heritage is both Mexican and Native American. He noted that what is particularly unusual in his case is that his Native American background is from the place he was born, which is Los Angeles. The other part of his background is of Mexican origin on his mother side. Often there is the assumption that people of Mexican origin in this country were here only for the last 20 years. It is important to understand that diversity. He added that another dimension to this when we look demographically at the United States, Jimenez noted, is the fact that people of both Latin American origin and Mexican origin represent a very significant population within the United States. But they are very severely underrepresented when it comes to people with Ph.D.s and with professional degrees.



Jimenez also emphasized that the important area of faculty pathways also deserves reflections. We need to train people to obtain Ph.D.s and we need to have those Ph.D.s get successful post-docs and be co-authors with senior people so that they can advance their careers, he added.

### **Successful Models and Future Initiatives**

Joan Reede, Harvard Medical School, served as the moderator of the second expert panel highlighting successful models and future initiatives being considered by the federal agencies, foundations and higher education institutions. Reede oversees many of the diversity and community outreach efforts for Harvard Medical School and its affiliated institutions. Many of the people who work in institutions around diversity efforts, Reede related, have a "charge that far exceeds" their capacity to meet that

charge, including responsibility for “diversity for faculty, staff, students, fellows, residents across the board.” Noting that she was talking about 20,000 people, Reede conveyed that “one of the interesting things is how can you actually work with institutions to effect change when there are very few of us in those institutions charged with effecting change.” She stressed that “collaborations end up being the way that we have to work forward.”

According to Reede, Harvard has more than 20 programs in her office, ranging from K-12 programs through faculty development programs. The minority faculty program has been in place since 1990 and Harvard’s number of underrepresented minority faculty has gone from 185 to 467. “So programs can work,” Reede maintained.



Adhering to the theme of the meeting, Reede briefly discussed Harvard’s biomedical science careers program. The program, which is not a Harvard Medical School program, but is a separate 501(c)(3) that was formed with the medical school, the New England Board of Higher Education, and the Massachusetts Medical Society. She related that the program has grown into an entity that served more than 6,000 students and involves biotech, farmer, device industry, law firms, colleges, universities, medical, dental schools, and nursing schools. “Through collaboration and looking at the continuum, the spectrum from high school through post-doctoral levels,” Reede explained that they have been able to design programs that address students’ awareness of career options that allows them to begin to understand that there are multiple points of entry and exit into the system, including nontraditional pathways where students can be successful, where they meet and get to

know role models, make connections and build networks across organizations.

Reede strongly emphasized “that this is not something where one entity works alone, but recognizes that if we are going to be successful in bringing students into the sciences, retaining them and moving them forward, we actually have to begin to collaborate and communicate across our different disciplines, across our different organizations. We have to start to think about success in different ways.”

### **‘The Scientific and Engineering Enterprise Is Strengthened By the Intellectual Diversity of Thought’**

Wanda Ward, Deputy Assistant Director for Education and Human Resources directorate at the National Science Foundation (NSF), commended the assembled organizations “for taking it upon themselves” to come together and “see how to move forward in the production of underrepresented minorities in the STEM fields.” Ward noted that for many at NSF this issue is their “passion” and is founded upon two assumptions: 1) NSF “genuinely believes that the scientific and engineering enterprise is strengthened by the intellectual diversity of thought, as well as the diversity and composition of the participants,” and 2) “the belief that excellence exists everywhere.” She added, that “we know the reality of the top 25, the top 10, and the top 100, but we do believe that excellence exists everywhere and are redoubling our efforts to try to support it as best we can.”



Ward related that most of her comments rested on the assumptions of the interaction between the individual and the institution. From the NSF's perspective, the institutional approach is one that is comprehensive and systemic, from pre-K to career.

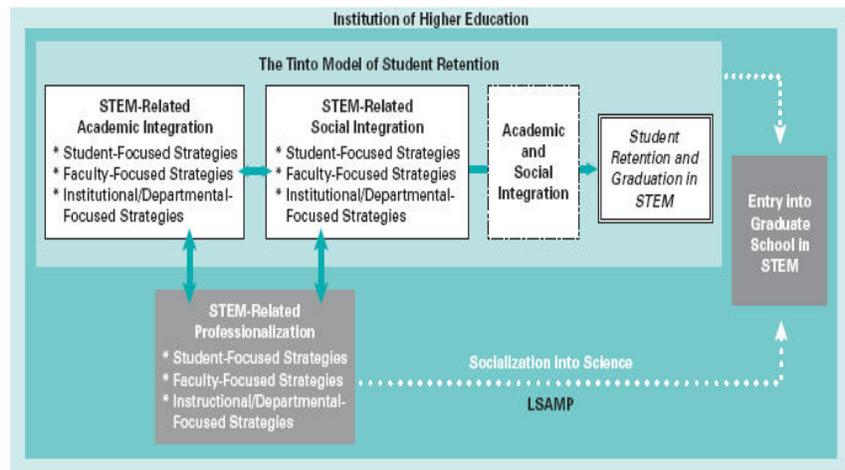
Ward discussed the Math and Science Partnership Program (MSP) as NSF's premier K-12 activity with the awards made to institutions of higher education to link with pre-K-12 systems to improve student performance in these subjects. According to Ward, the most recent data released by NSF show that there is an increase in the 2003-2004 year of students who participated in 52 projects funded under the MSP. She noted that new solicitation issued this year includes a new component called MSP-Start, which is expressly designed for including more minority-serving institutions.

She also explained that with regard to the agency's efforts at two-year colleges, technical education is a major emphasis. The NSF's Advanced Technological Education (ATE) programs are tailored to industry and company requirements. ATE-trained technicians are highly qualified and need little additional training other than company specific training provided to all employees.

According to Ward, NSF's "flagship program at the undergraduate Bachelor of Science production level is the Louis Stokes Alliances for Minority Participation (LSAMP)." She noted that the Tinto Model of Student retention describes many of the components that have led to the success of the LSAMP program. The model incorporates STEM-related academic integration plus STEM-related social integration.

Ward also referenced a study by the Urban Institute where underrepresented minorities who participated in LSAMP programs were compared to students who were in graduate school, particularly whites and Asians, and to underrepresented minorities who were not in LSAMP. The study found at every level, in terms of the courses that were taken in graduate school, those who pursued scientific graduate degrees as well as those who completed graduate degrees, the LSAMP students outperformed the white and Asian students and the underrepresented minorities not in the cohort.

The IGERT (Integrated Graduate Education and Research Traineeship) Program is another one of NSF's flagship programs that is directed toward the graduate level. The emphasis in IGERT, Ward explained, is interdisciplinary as well as international experiences for global competitiveness. An independent evaluation revealed that "those who participated in the IGERT program fostered much greater disciplinary linkages, in terms of participating in interdisciplinary labs, taking interdisciplinary courses, and publications."



Ward also cited the Alliances for Graduate Education to the Professoriate (AGEP) and that of the 1,450 Ph.D. underrepresented minorities produced in the U.S.; 640 of those participated in the program. She concluded her presentation with a discussion of where the NSF is headed in 2008 and 2009. This includes a program that NSF calls I<sup>3</sup> -- innovation though institutional integration. The assumption, Ward explained, is that innovation is known to be a driver of the scientific enterprise as well as economic competitiveness. The agency is charging itself with taking a look at every state in the U.S. and at every award that it makes in a state or particularly on a campus. Through I<sup>3</sup> NSF plans to provide funding of up to a million dollars over five years for an institution, an alliance, a region, or a

consortium of institutions to come together to make sense of the various awards. The awards, she explained, can revolve around broadening participation, or critical junctures - integration of research and education or research and evaluation. This will allow NSF to know where its awards are and who's doing the research. The interesting possibility for the participants at the *Enhancing Diversity in Science* meeting is for "various associations to take a look at where can we leverage this, what value-added can we bring to bear collectively that none of us individually is able to accomplish in the production of talent."

### 'Workforce Development Is Fundamentally a Systems Problem... '

In addition to bringing the participants up to date on the activities at NIGMS, Director Jeremy Berg, also highlighted "the changes in [NIGMS'] thinking about how to really think about these problems." Berg began by emphasizing that the "question of workforce development is fundamentally a systems problem, a network problem, not just a pathway, or sort of pipeline problem." Observing that there are a lot of different inputs and outcomes, He stressed that the one issue that NIH is most concerned about from the point of its mission is "developing a workforce for university and college faculty." At the same time, he noted, we know that students go on to successful careers in industry, in the case of M.D.s and other doctor degrees in practice, even some people go into government, other policy positions, and that "these are all successful outcomes."



Berg shared that the Institute has been encouraged by its advisory boards and working groups to focus more intensively on examining university and college faculty. How are we doing in diversifying university and college faculty? Are we producing individuals who are really interested in, prepared for, competitive for, university and college faculty positions? Those questions, from an NIH perspective, have two impacts. First, it's those individuals who are going to most likely participate in biomedical research funded by NIH. There is a strong sense that since university and college faculty are key to the training of the next generation that by diversifying university and college faculty, there is a real potential for having a catalytic effect in terms of making science careers and biomedical research careers more welcoming to groups that have been traditionally underrepresented in NIH-funded research. The second is an issue that the NIH is concerned about, the changing career path for biomedical research through the years. There is particular concern regarding the increase in the amount of time that people spend in post-doctoral fellowships.

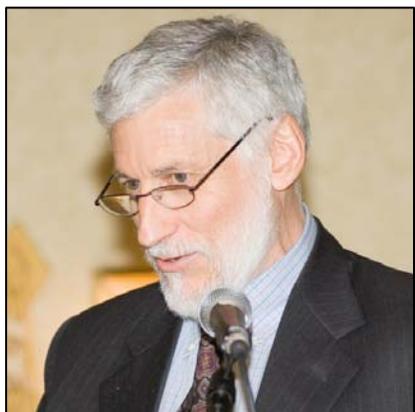
Pointing out that a lot had been said about the K-12 programs, Berg maintained that this is really sort of "a K through 34 program of getting to the point that you are funded by NIH to do research." That has a number of implications, he added, both in terms of where the possibilities are for programs to help support individuals or support institutions through these various stages, support the transitions, but also the whole attractiveness of these careers. An issue that the NIH has to come to grips with, according to Berg, is that the average age for first time independent awards for NIH is now substantially over 40. He added that it is little less than that in basic science as opposed to clinical areas.

NIGMS supports a number of institutional programs, MARC [Minority Access to Research Careers], MBRS [Minority Biomedical Research Support], U-STAR [MARC Undergraduate Student Training in Academic Research], and RISE [Research Initiative for Scientific Enhancement]. The Institute's T-32 programs are the institutional training programs directed to underrepresented minorities. One of the steps that is getting underway with increasing energy, Berg pointed out, is the integration of the special programs with the T-32 programs, and the mainstream training programs that NIGMS has supported.

Noting that there had been repeated comments on the importance of building evidence, Berg emphasized that this is important both from the point of view of understanding programs, determining how to modify programs, knowing what works and why, and from a legal perspective having an evidence base that will allow clarity and presentation of what programs are supposed to do, what they have accomplished, and why they are needed. To that end, he highlighted the Institute's research program on the efficacy of interventions to promote research being led by Cliff Poodry, including the workshop, [Understanding Interventions that Encourage Minorities to Pursue Research Careers: Major Questions and Appropriate Methods](#), held last year and the accompanying report. He also announced the second workshop, [2nd Annual Conference on Understanding Interventions that Encourage Minorities to Pursue Research Careers](#) being held in Atlanta, May 2 - 4, 2008.

He explained that another important area is to connect the components. According to Berg, NIGMS has discovered is that undergraduate students who were supported through the MARC program (an honors, junior, senior program at minority-serving institutions) are not as well connected with the T-32 programs as they might like. This could result from a lack of awareness, information transfer, or the fact that the programs are not really preparing the students in the ways the T-32 programs are seeking. To address this issue, since September 2007 NIGMS has instituted the community for advanced graduate training, a web-based tool that allows program directors and students to register and then look for information about the various programs that are supported between the MARC program and the T-32 programs, post their resumes and start conversations, Berg explained. This allows for the building of relationships earlier on, rather than just at the point that a student has completed their undergraduate training and is now applying to the graduate programs and finding out that they don't know about the program or that they have not taken the courses they need to be competitive and go on to the programs, he concluded.

### **'We Have Made Preparation For Scientific and Increasingly For Engineering Careers . . . So Unpalatable'**



Discussing the programs of the Sloan Foundation, Ted Greenwood provided a different perspective from that of the other presenters and focused on the labor market for science and engineering professions. The Foundation "does not work in the areas of social science or humanities." "Generally, when reasonable salaries are offered, which is not always the case, and when reasonable work conditions are offered, which is not always the case, there are ample qualified people available for science and engineering positions in the United States," Greenwood insisted. What we need, he argued, is a different mix of Americans, particularly more underrepresented minorities.

According to Greenwood, in the United States, we have made preparation for scientific and engineering careers and in some respects, these careers themselves, particularly in academia, "so unpalatable that it is difficult to attract Americans to those fields and retain Americans in them." On the other hand, he explained, non-Americans, who have different incentive structures "flock to the U.S. and to these fields here." "We need to make science and engineering careers and the preparation for these careers more attractive to Americans," he declared.

Despite the problems with our public K-12 education, "there are more high school graduates qualified for and interested in science and engineering careers than there are jobs in these fields," Greenwood continued. They either do not enter the pathways to these careers or they leave these pathways as undergraduates or graduate students. Our biggest problem is attracting American students, especially

underrepresented minority students, into science and engineering education at the undergraduate and graduate level and retaining those who enter, he insisted.

The Sloan Foundation's goal is to increase by 100 per year the number of minority students earning Ph.D.s in mathematics, natural science, and engineering. Sloan's objective is not to transform institutions; there is not the money to do that, Greenwood noted. Instead, Sloan starts by finding faculty with a record of success with underrepresented minority students or faculty in whom the Foundation has confidence that such faculty can successfully recruit, mentor, and graduate minority students with Ph.D.s. The reasoning is that the Foundation wants to make sure there are real recruitment efforts underway. Most departments don't recruit. "And the higher ranked you are as a department, the less you recruit, generally," Greenwood explained.

Once faculty is brought into the program, Sloan provides financial resources to enable them to increase their numbers of new minority Ph.D. students above the historical baseline number. The Foundation also offers a scholarship to the students. Currently, the amount is \$38,500. The money goes directly to the student, which allows the Foundation to do this from a legal perspective. "We do not entangle the universities in nefarious things like making judgments about financial aid based on race and ethnicity." The institutions can use the money for any purpose they want except that they may not provide a tangible benefit to a minority student not provided to non-minority students, Greenwood noted. On the other hand, Sloan expects the faculty and the departments to support these students just like they support any other student. Faculty is also held accountable for increasing the numbers above the baseline and for the success of their students. If they are not succeeding in both respects, they do not remain in the Foundation's programs very long, said Greenwood. Currently, the Foundation has 81 particular programs on 43 campuses around the country.

On the feeder component of the program, the Foundation works with departments. The money goes to the university, and the grants are open to all students as a practical matter. This part of their program, he shared, has not been as successful and they are shifting their emphasis.

## Recommendations Emerging from Breakout Sessions

Participants were assigned to one of five breakout groups and asked to consider three themes throughout their discussions: 1) collaboration, 2) policy, and 3) funding. Below are some of the recommendations that emerged from the breakout sessions. The coalition expects that some areas for proposed action may require new vehicles for effective collaboration, such as a new e-mail listserv for associations and societies to share information, and one or more future workshops devoted to a specific area for action, such as the development of common outcome measures to enhance program evaluation.

### *Evaluating Diversity Program Outcomes*

- Associations, in collaboration with institutions and funders, should collect and critically review research and best practices on programs that can be evaluated and generalized across disciplines and understood by others. This could generate a typology on the types of programs according to goals and career stage. This should be continually updated and available by such means as a Web portal, journal articles, critical reviews, etc. Associations could use society meetings, Web sites, publications, etc. to publicize this information.
- Associations need to work together on these issues so societies with the necessary expertise can help those who don't have expertise (sharing capacity).
- Associations should work with each other and with the federal agencies to better inform data-collection strategies and to integrate datasets, when possible.
- Associations need to educate their members on the value of collecting these demographic data to increase the participation rates for these voluntary responses.

- Associations need to advocate for enhanced federal longitudinal data collection strategies for these issues. Associations need to advocate for including support for evaluation in program funding.
- Associations should collaborate with departments on collecting this information, getting buy-in from the central administration. Ideally, professional societies should work with departments at the *same* institution to achieve critical mass across disciplines.

### *Mentoring Underrepresented Minorities*

- Bring attention to the need to incentivize quality mentoring by institutions/faculty.
- Encourage funders to incorporate broader impacts review criteria into grants (some disagreement).
- Encourage investigators to seek supplemental grant funds to cover mentoring activities.
- Showcase success stories to demonstrate the value of mentoring for individuals and institutions.
- Develop a pool of mentors/mentees who can promote the value of mentoring.
- Build an infrastructure to support long-term mentoring relationships.
- Develop a mechanism to evaluate the sustainability of mentor/mentee relationships.
- Develop a resource to help mentors and mentees understand their goals and expectations.
- Use associations' newsletters as a means of outreach.
- Bringing students to annual meetings for both scientific and non-scientific programming and networking opportunities.
- Collaborate with other associations to develop definitions of program success, evaluation metrics, and collect data on program outcomes.

### *Retaining Underrepresented Minorities in Science: Students through Early Career Professionals*

- Associations must be accountable for reflecting the diversity and inclusion principles they espouse in their policies, strategies, program implementation, and leadership.
- Associations can serve as linkages to aid transitions across gaps in mentoring during the professional education process.
- Associations can advocate for funding and policy development to support diversity initiatives.
- Associations can improve data and outcomes research.
- Associations serve a critical role in identifying, highlighting and rewarding best practices, models, etc.

### *Retaining Underrepresented Minorities in Science: Early through Later Career Professionals*

- Build diversity goals into professional associations' strategic plans.
- Provide incentives and requirements for mentoring.
- Request universities to collect data and provide them with models for collecting the data.
- Increase communication with universities about how underrepresented groups are faring, thereby increasing university consciousness and setting expectations/norms for behavior.
- Recognize best practice within educational institutions.
- Provide more money for professional development workshops.

### *Generating Support for a Diverse Scientific Workforce*

- Develop a joint public statement with accessible language that articulates common goals and encourages policy development to affirm those goals.
- Identify best practices, common challenges, and gather data to inform policy.
- Use data as well as compelling anecdotes—tell the story well—to make the case for diversity.
- Develop an informal network of individuals interested in promoting this issue.
- Provide leadership to members by promoting the importance of diversity.
- Recognize and support institutional practices that advance diversity.

## Next Steps

The ultimate aim of the retreat is to arrive at new recommendations for action on the part of associations and societies. It was designed to generate a shared commitment to the problem, new opportunities for collaboration across diverse organizations and areas of science, and specific action steps that the associations and societies can carry out to achieve progress. Participants were assigned to one of five breakout groups and asked to consider three themes throughout their discussions: 1) collaboration, 2) policy, and 3) funding.

A report will be generated from the retreat and posted on [COSSA's website](#). In addition, recommendations from the working groups as well as a transcript of the speakers' presentations will also be posted. The committee members are currently deliberating how it plans to move forward. Individuals interested in being notified when the report is available can send an email message to the [Enhancing Diversity in Science Collaborative](#).