



COSSA

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CEDS Holds Workshop to Develop Metrics for Enhancing Diversity in Science

On May 24, the Collaborative for Enhancing Diversity in Science (CEDS), led by COSSA Deputy Director Angela Sharpe, held its second workshop around enhancing diversity in science (for information about the earlier workshop, including its report, go to www.cossa.org.) The new workshop, ***Enhancing Diversity: Working Together to Develop Common Data, Measures and Standards***, was designed to address the need to establish a more comprehensive and cohesive effort to track the many and various efforts of government, university, private foundations and associations to enhance minority participation in the sciences.

The Workshop was sponsored by the *Eunice Kennedy Shriver* National Institute of Child Health and Human Development (NICHD) in collaboration with the National Institutes of Health's (NIH) Office of Behavioral and Social Sciences Research ([OBSSR](#)), the Office of Research on Women's Health ([ORWH](#)), National Institute on Drug Abuse ([NIDA](#)), National Institute on Minority Health and Health Disparities ([NIMHD](#)); and the National Science Foundation's ([NSF](#)) Directorate for Education & Human Resources ([EHR](#)) (Historically Black Colleges and Universities Undergraduate Program (HBCU-UP) and Research on Gender in Science and Engineering (GSE)) and the Directorate for Social, Behavioral and Economic Sciences ([SBE](#)) (Division of Behavioral and Cognitive Sciences) ([BCS](#)) - Social Psychology program and the Division of Social and Economic Sciences (SES) programs in Economics, Science of Organizations and Sociology; the Alfred P. Sloan Foundation ([Sloan](#)); the Robert Wood Johnson Foundation ([RWJF](#)), and the William T. Grant Foundation ([W.T. Grant](#)).



ASA Executive Officer Sally T. Hillsman

The May 24th workshop recognizes that moving towards collaboration on a common set of high priority measures has the potential to inform, target, and strengthen efforts to increase diversity in the sciences, and to do so across institutions participating in these efforts. Further, the process of working towards common measurement in itself can provide an opportunity for mutual updates on data tracking efforts and initiatives that government agencies are sponsoring, and in which colleges, universities, foundations, and nonprofits are already engaged.

Overview and Purpose

In explaining the purpose and overview of the meeting, Sally Hillsman, Executive Officer of the American Sociological Association, explained that "diversity and excellence have always been keys to science, to scientific advancement, to creativity and innovation, and to productivity. Diversity in science has long been recognized as requiring that we encourage variability in theoretical, methodological and other perspectives." It has taken somewhat longer, she added, to recognize that diversity and excellence in science also require that "we not only tap all the talent available by broadening the community of scientists to include those from diverse backgrounds, but that we also acknowledge that such inclusiveness is fundamental to the vitality and excellence in science."

Hillsman pointed out that scientific societies and professional associations have been central to systematically addressing the community's efforts to enhance the diversity of science since their emergence in the late 19th and early 20th centuries. It was inevitable, said Hillsman, that scholarly societies and associations of scientists would begin to collaborate to address the diversity of the scientific workforce, as it had come to collaborate on other critical science educational policies. The strength of CEDS lies in the "interdisciplinary approach to fostering communication and forging partnerships that can lead to more effective engagement of scholars, practitioners, administrators and funders who will work with the scientific disciplines to address the increasingly complex challenges of achieving diversity that is essential to scientific excellence."

The workshop builds on one of the major themes of the 2008 [Leadership Retreat](#), a disciplinary-wide retreat of professional associations and scientific societies. The Retreat acknowledged the individual and collective frustration with the lack of "very basic scientific tools, relevant metrics, and standardized data across a broad spectrum of educational institutions that are necessary to evaluate diversity program outcomes, to mentor effectively underrepresented minorities, to retain those underrepresented minorities in science from their roles as students of science and through the process of becoming major productive career professionals, and finally, to generate the broad support we need to enhance the goal of a diverse scientific workforce."

"Collaboration is the key to this effort...individual efforts, whether they are individual persons or individual organizations, is not enough. We are now facing a far more complex environment and need to think strategically and collaboratively about how we are together going to move this agenda forward," Hillsman concluded.

Welcoming workshop participants, NICHD Deputy Director Yvonne Maddox noted that she thought found it "very fitting that NICHD serve as grantee" for the workshop, because it is looking at issues that the Institute cares about. "We're looking at data, we're looking at measures, and we're looking at standards. And how can one look at a problem or circumstance - because there are circumstances, perhaps, that exist around diversity - without having the appropriate data and the appropriate tools to measure and to track diversity."

Maddox pointed out that "at the time in which minority population in this country is really growing, we

are seeing what appears to be a diminution or a dropping or laying-off of those who come into the sciences, particularly in engineering and math." Emphasizing that the operating word is "appears" to be, Maddox declared that "we really do need to have the data to substantiate where we are and what is really happening. We need to start with a base that each of us can operate around and that we use the same terminology with, we use the same approaches to gathering this information and, of course, in tracking it."



NICHD Deputy Director Yvonne Maddox

Noting that many of the Fortune 500 companies want to say they are diverse or they're working toward diversity, Maddox remarked that one of the "critical issues" addressed by the workshop and which would be very important for the NICHD, is to get a handle around how one measures the value that one puts on diversity and having a diverse workforce. Looking at how one could appreciate diversity and why it is important is significant for the NICHD, Maddox asserted, because the Institute feels that a "diverse medical research enterprise will allow us to really address the scientific areas that are critical to it." We need to appreciate that when minorities are not included in research or not included in science, math, and technology, everybody is disadvantaged.

Maddox emphasized that another reason "the NICHD is very interested in supporting this workshop is because we believe in the concept of excellence. And we think that diversity brings about that extra level of excellence that one does not get when there is a homogeneous group of people working together...diversity gives you that fresh look and gives you other eyes that can make things a little bit more appropriate for a particular community or for a particular individual."

Diversity and the NIH

NIH Deputy Director Lawrence Tabak addressed the importance of diversity from the perspective of the agency. Tabak reviewed the data associated with the changing demographics in the U.S. and the census of principal investigators on research programs grants at the NIH. Tabak highlighted the fact that black or African Americans, Hispanic or Latinos of any race, and all native persons in this nation are woefully underrepresented among [NIH] investigators. "There are many, many reasons for this," he declared, "and you would need multiple, multiple conferences to dissect all of the causes and issues surrounding this. But the bottom line is that . . . our principal investigators, our workforces, our scientific leaders in biomedical research, do not reflect the nation."

Tabak reviewed the NIH-commissioned paper that appeared in SCIENCE magazine, co-authored by Wally Schaefer, and former Deputy Director Raynard Kington, which uncovered a racial disparity in grant awards, in particular for black or African American applicants. He highlighted another set of conclusions in the SCIENCE paper in which Donna Ginther is the lead author, which showed that award probabilities correlate with the NIH funding rank of the applicant's institution. The other sobering piece to this, lamented Tabak, is that even within the top 30 funded organizations, black or African Americans applicants still showed a disparity in the funding. "So it is not only about great research infrastructure; it is not only about the great toys that you have at your disposal; it is not only about the great colleagues. There is something else going on. And the only things that seem to make a difference for black or African American applicants are prior grant review experience," he explained. The "conundrum," Tabak continued, is that "you don't get on a study section until you have a grant, but unless you get a grant, you are not going to be on study section, and if you are not on study section it will not help you." He recognized that it is a circular argument.



NIH Deputy Director Lawrence Tabak

In response to the commissioned study, Tabak noted that he and NIH director Francis Collins offered a [policy forum](#) article in SCIENCE that laid out the NIH's plan of action: the need to evaluate extant training programs so that we can phase out the programs that don't work well and expand the ones that are successful, and increase the number of early career reviewers, which speaks directly to the conundrum noted above. Accordingly, the NIH is seeking nominations of individuals who have not received their first NIH grant yet, to experience the review process by serving on an ad-hoc basis from the "broadest and most diverse set of institutions from around the country (self-nomination is allowed), looking at the grant review process, the potential biases and then the quest to develop interventions and proof support for individuals preparing grant applications, and then finally to gather expert advice on additional steps. "

He pointed out that the NIH has conducted a request for information (RFI). He shared some of the main issues identified from the RFI: transition points, the need for mentorship, and conscious and unconscious biases. Tabak concluded his remarks by highlighting the NIH Director Working Group on the Diversity in Biomedical Research Workforce, which is scheduled to report on June 14.

NSF and Broadening Participation

NSF Deputy Director Cora Marrett began by noting that Albert Einstein recognized that "new ideas, new mechanisms and new approaches to old problems are essential for making advances in science." She added that the same thing pertains when we talk about advancing the broadening of participation, which "requires new approaches, new ideas, new collaborations and new metrics as very much this workshop will emphasize. It will require new investments."

Marrett pointed to the importance of investments in what's in the science of broadening participation. This suggests it is important for all fields to think about the level of diversity, including the social and behavioral and economic sciences, Marrett emphasized. But the science she continued, draws the ideas, and the from particular disciplines. important to draw on and disciplines, many of those going to advance the science - not just the science, but profound interest," stressed



NSF Deputy Director Cora Marrett

of broadening participation, especially on the models, frameworks that can evolve "Thus it is extremely draw in the range of represented here, if we are of broadening participation the outcomes that are of Marrett.

She emphasized that NSF shares with others the commitment to the broadening of participation for the reasons elaborated: the loss of talent that has implications for the nation and means the blocking of opportunities for individuals. NSF's assurance to pursuing this issue is evident in the strategic plan of the Foundation. Marrett reemphasized the importance of the systematic, methodologically-advanced ways for thinking about the broadening of participation.

Pointing out that the NSF is not only interested in broadening participation because it will help the agency's agenda, but because the Executive Office of the President recently submitted to all federal agencies a call that begins this way: "Since taking office, the president has emphasized the need to use evidence and rigorous evaluation in budget, management and policy decisions to make government work effectively. Where evidence is strong, we should act on it. Where evidence is suggestive, we should consider it. Where evidence is weak, we should build a knowledge base to support better decisions in the future."

Her attendance at the meeting, she said, was more than just a passing interest. She was at the workshop to state that NSF needed help because of the need to bring together the best of the evidence to try to suggest what should be used in the programs the agency supports for broadening

participation. NSF, Marrett shared, has already made some plans for expanding the initiative around the science of broadening participation, primarily by the Directorate for the Social, Behavioral and Economic Sciences. The Education and Human Resources Directorate will also support the initiative. The interest, however, is not limited to those parts of the NSF. "Every part has an interest and a need, even if they haven't recognized it: systematic, logical, theoretically driven work that can underlie-that must underlie-the science of broadening participation," said the Deputy Director.

Marrett noted that the agency is reviewing all of the programs that are in the portfolio of broadening participation because "some of the programs have direct implications." Others would be rather indirect, meaning that they might make contributions.

Marrett requested the assistance of the workshop participants for the "kind of collaboration that is going to be needed, collaboration across disciplines, collaborations across sectors, because it is only through that kind of collaboration [she] believes we are going to have the new ideas, the new methods that Einstein indicated is so critical for advancing all science."

She shared another directive from the Office of Management and Budget that says OMB and the Council of Economic Advisors will organize a series of topical discussions with senior policy officials and research experts in the agencies that will focus on administrative and policy levers for driving an increasing share of federal investments into evidence-based practices. "We collectively, then, need your input and ideas, as we say, here is a significant area of importance for the nation, the broadening of participation....it will require far more of the innovativeness, the creativity that should undergird anything we undertake," Marrett concluded.

Framing the Issues

Felice Levine, Executive Director of the American Educational Research Association, was charged with framing the issues and sharing remarks that would serve as a catalyst for advancing the key issue of the workshop: working together to develop common data measures and standards. Levine began by emphasizing the importance of research and data generally on these issues.

She noted that the 2008 Leadership Report recognized the need for enhancing diversity, "not just in the interest of equality or to redress past, or prevent current, discrimination and unequal access, but it is, above all, to promote our national interest. The collective intellectual capital in the United States and the capacity of our nation to remain in its leadership role across the sciences in a world where intellectual property is coming to be as or more valuable than other property depends on broadening the domestic base of science participation."



AERA Executive Director Felice Levine

Levine recognized that while there has been progress over the last four years since the Retreat, the stakes for our nation are, if anything, greater than they were four years ago. She pointed out the recent announcement that for the first time since our nation's start, births from ethnic minority groups exceeded those from white Americans. "We simply cannot afford a society in which the potential of three-quarters of America's children is not fully developed and tapped and where the talent is not capitalized to the benefit of science," Levine insisted.

She reviewed the purpose of the 2008 Retreat which, among the issues highlighted, selected for special attention the array of programs, some run by professional associations and some by universities and other institutions that were designed to recruit women and minorities to careers in science. Suggestions, Levine noted, were made about how those goals might be accomplished and the need to

collect data to determine where we stood collectively, both as a nation and as an integral community of science fields and disciplines.

The goal of the May 24th workshop is to map out those very steps needed to follow up on that conclusion. She noted that all or almost all of those attending the workshop were scientists from one background or another, or representatives of organizations whose role is to support or advance one or another of the sciences. But the ultimate goal of their activities, Levine underscored, is to promote diversity of all sciences, social or physical, biological or behavioral, educational or medical, data is the conference's focus. "Science relies on data, and we must collect scientifically valid data to advance science."

This observation, she noted, however, begs the question, what data are needed and how must the data be gathered and exploited to tell us what we need to know? She suggested some areas as they relate to our need to assess the presence of women and minorities in science and how diversity may be enhanced.

First, we need to gather, collect, organize, make available and analyze data which relate to the dimensions of the issues that concern us. We need to know about the presence of women and minorities in science education pipeline in all sciences. How many people of diverse backgrounds do we find, and at what stages? How do different people sort themselves into different career trajectories? And at what point, under what influences, are crucial decisions made between higher education and no further education, between the science and humanities, between graduate school and professional schools, between the social sciences and the natural sciences, between sociology and economics or biology and physics, between stopping at the bachelor's degree or being stopped - or master's degree or going on to the Ph.D.? The challenge is to identify and collect data that help explain these different trajectories, Levine stressed. She recognized that such grand issues require large-scale systemic, often longitudinal data systems, where the attention is to the articulation between levels of education, career and scientific fields.

Second, we need data to evaluate the many efforts that have been, or will be, undertaken to increase the presence of women and minorities in the various sciences. How important are targeted scholarships and fellowships? How much difference, if any, does the presence of a mentor make? Are mentors who share the mentee's gender or ethnicity more effective than mentors who lack these characteristics? And if so, why? How important is affirmative action at both the undergraduate and graduate levels been in increasing the presence of women and minorities in fields where they have been underrepresented?

Does reaching out to students while still in high school or even junior high or elementary school have positive long-term effects? What is the effect of special programs like summer research internships or the commitment of diverse groups to careers in science? What programs are differentially successful? What determines these differences? How much does program leadership matter, financial support, teaching innovations, the kinds of students attracted to the area of science and the culture within that area of science for inclusivity? The challenge is to identify and collect data that explain the effectiveness of different interventions, said Levine.

Third, we need to know more about the people whose careers concern us. What leads women and minorities to choose careers in science? At what ages do they decide? What family members or other significant persons, if any, are important influences on their decisions, the kinds of mechanisms and processes that Deputy Director Marrett made reference to? How much do subjective views of mathematical skills matter in career choice, that self-perception and the sense of self and how that relates to the career choices and career trajectories we all make? How much do objective measures of these skills matter, e.g. verbal skills? Do women and minorities feel disadvantaged by discrimination? If so, what examples do they give?

Are some kinds of undergraduate institutions, small colleges, women's colleges, majority-minority

institutions more likely to send their students on for advanced degrees in the sciences than other institutions? Has this pattern remained stable over time? Do women and minorities perceive the costs and benefits of science careers differently than white males? Do women and minorities who have embarked on science careers perceive the costs and benefits differently than white males? The challenge is to identify and collect data that explain personal characteristics and experiences that lead people toward or away from careers in science.

These are but some of the questions and kinds of questions that we need data to answer. But are these the right questions? What kinds of data will tell us the most about career choice of women and minorities, about what affects them and how even differences between and among racial and ethnic groups play themselves out? Can we develop models that explain the science career choices of women and minorities and how they differ from each other or from similar choices by white males?

Levine pointed out that our needs extends beyond collecting data to developing reliable, empirically testable theory that will help us understand what matters to the career choices of women and minorities and the mechanisms by which individual backgrounds and experience and planned interventions interact and work.

We lack the kind of rigorous, replicated research or, often, a priori designs that would allow for a Campbell collaborative report or similarly useful synthesis. While there are indicators and instances of collaboration and communication, we are not close to where we need to be. People doing research on these issues collect data in many different ways. Studies typically lack common metrics, sometimes for even some basic concepts as ethnicity. Seldom can we put these findings of different studies together in ways that might help us to develop testable theories about what variables are important and what interventions work, with whom and why. Developing common standards and metrics and establishing a repository for data would enable advances in the understandings we all desire.

In undertaking this effort, Levine explained, we will want to attend to such standards as they need to come into play, one in individual studies and evaluations; two, in the development and enhancement of large-scale databases; and three, in the improvement of administrative records and data systems of federal and state governments of which we know, for all of our sciences, we are going to increasingly rely.

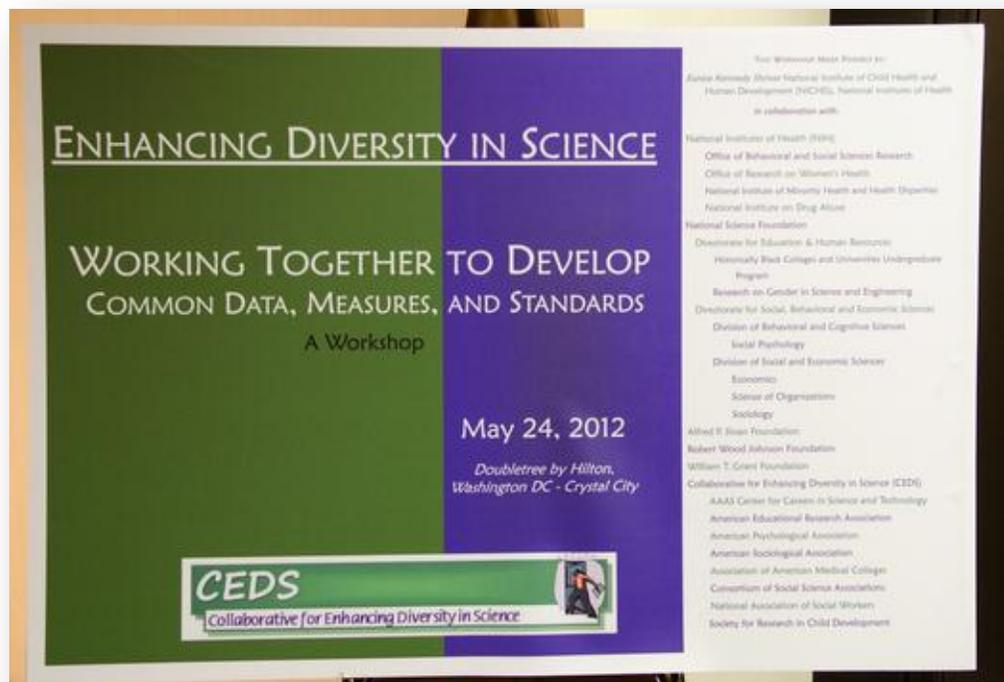
She noted, that the act of engagement of our federal science agencies and the federal statistical agencies within them, in particular the National Center for Education Statistics at the Department of Education and the National Center for Science and Engineering Statistics at the National Science Foundation, could and should be important allies, partners and collaborators in the process.

We are also in an area where it is easy to imagine experimenting with interventions. For example, oversubscribed programs designed to attract women and/or minorities to careers in a particular science discipline might choose its beneficiaries at random and follow both those chosen and not chosen to determine if the intervention affected the choices of or success in science careers, she posited.

We should not overlook the value of qualitative research and gaining understandings of the dynamics and mechanisms underlying diversity, nor should we ignore the ways in which qualitative data can today be preserved and shared. One might, for example she noted, learn a good deal from in-depth interviews with women and minorities and white males who have started on the path to a science doctorate and then dropped out. Knowing whether motivations for dropping out or persistence differ by race, ethnicity, or gender would be of considerable value. It would be similarly valuable to know if reasons differed systematically by field of science, for knowing these differences might enable poorly performing institutions or fields to ameliorate and address the problem. Completely separate studies are unlikely to take us far in these directions. But if a common core protocol were developed and if the qualitative data were coded using the same programs and following a common science, much could be learned.

Levine concluded her remarks by noting that the point of the conference was not just to be stimulating. It seeks to advance the ball that we kicked off in 2008 and to be a step toward developing the knowledge we need in order to promote the diversity of science that is necessary not just for individual fairness and fulfillment, but also for the nation's well being. The knowledge we produce must be used, and researchers, professional associations, and federal and foundation funders must be prepared to build on the exchanges in the room to develop better measures of how well we are doing in promoting diversity in science and a good understanding of the individual dynamics and organizational actions that can promote a more diverse scientific community. "I am optimistic about what a collaborative effort can yield and will be catalyzed by the work that will unfold today," said Levine

Next steps include a report which will be posted on COSSA's [website](#).



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