SEEKING SOLUTIONS

Maximizing American Talent by Advancing Women of Color in Academia

SUMMARY OF A CONFERENCE

OVERVIEW

NATIONAL RESEARCH COUNCIL
OF THE NATIONAL ACADEMIES

COMMITTEE ON WOMEN IN SCIENCE, ENGINEERING, AND MEDICINE

RITA R. COLWELL (NAS), Chair, Distinguished University Professor, University of Maryland, College Park, and Johns Hopkins University Bloomberg School of Public Health

ALICE M. AGOGINO (NAE), Roscoe and Elizabeth Hughes Professor of Mechanical Engineering, University of California, Berkeley

JOAN W. BENNETT (NAS), Professor, Department of Plant Biology and Pathology, Rutgers University

JEREMY BERG (IOM), Professor, Computational and Systems Biology, and Associate Senior Vice Chancellor for Science Strategy and Planning, University of Pittsburgh

ROBERT J. BIRGENEAU (NAS), Chancellor Emeritus, University of California, Berkeley

JENNIFER CHAYES, Distinguished Scientist and Managing Director, Microsoft Research New England

EDWARD D. LAZOWSKA (NAE), Bill & Melinda Gates Chair in Computer Science and Engineering, University of Washington

VIVIAN W. PINN (IOM), Senior Scientist Emerita, Fogarty International Center, and Former Director (Retired), Office of Research on Women's Health, National Institutes of Health

PATRICIA TABOADA-SERRANO, Assistant Professor, Rochester Institute of Technology

VALERIE TAYLOR, Senior Associate Dean of Academic Affairs, Dwight Look College of Engineering, and Regents Professor and Royce E. Wisenbaker Professor, Department of Computer Science and Engineering, Texas A&M University

LYDIA VILLA-KOMAROFF, Chief Scientific Officer, Cytonome/ST, LLC

SUSAN R. WESSLER (NAS), Distinguished Professor of Genetics, University of California, Riverside

SHELDON WEINBAUM (NAS, NAE, and IOM), CUNY Distinguished Professor of Biomedical and Mechanical Engineering, The City College of the City University of New York

STAFF

Catherine Didion, Director

Wei Jing, Research Associate

Sara Frueh, Communications Writer

This overview summarizes presentations and discussions in *Seeking Solutions: Maximizing American Talent by Advancing Women of Color in Academia: Summary of a Conference* (2013). The full conference summary is available at http://www.nap.edu/catalog.php?record_id=18556. This study was supported by Grant No. 1049637 between the National Academy of Sciences and the National Science Foundation. Any opinions, findings, conclusions, or recommendations expressed in this publication are those of the author(s) and do not necessarily reflect the views of the sponsors who provided support for the project.

OVERVIEW

The scientific and technological strength of the United States on the global stage is at a critical juncture. As other nations expand their scientific and technological capacity, U.S. research and educational institutions and industries have encountered difficulties in attracting and retaining individuals in science, technology, engineering, and mathematics – the STEM disciplines. The United States needs "all hands on deck" and must attract and retain its top talent in these fields.

Demographic shifts underway mean that the pool of talent from which the nation draws is becoming more and more diverse, with present-day "minorities" projected to be in the majority by 2050. Universities, however, are often ill-equipped to support people of color, especially women. Instead of having all hands on deck, U.S. institutions watch as large numbers of students, teachers, and researchers leave the STEM pathway at several key transition points.

To explore ways that U.S. universities can attract and retain women of color in STEM fields, the National Research Council held a conference in June 2012, "Seeking Solutions: Maximizing American Talent by Advancing Women of Color." Success in academia is predicated on many factors and is not solely a function of talent; conference presenters and participants aimed to elucidate those other factors and highlight ways that institutions might take action to influence them, fostering cultures that are hospitable to people of every gender, race, and ethnicity.

A summary of the conference was published in 2013. This overview highlights some presentations and data from that summary. The views expressed are those of individual conference participants and do not necessarily represent the views of all conference participants, the planning committee, or the National Research Council.

DONNA GINTHER AND SHULAMIT KAHN: CAREER PATHWAYS OF WOMEN OF COLOR

To attract and retain more women of color in academic STEM fields, it is important for institutions to understand the points along educational and career pathways where these women are currently being lost. A presentation by Donna Ginther from the University of Kansas and Shulamit Kahn from Boston University identified some of those stages. Ginther and Kahn analyzed data to identify the representation of women of color (U.S. citizens who are African American, Hispanic, Native American, or Pacific Islander) at key points along the educational and career pathways in STEM fields, using 1993-2008 data from National Science Foundation's Survey of Doctorate Recipients and several other data sources.

Although women of color graduate from high school at rates similar to those of other groups, their numbers drop dramatically by college graduation; 40 percent of women leave the education pathway between high school graduation and a bachelor's degree. Looking more closely, Ginther and Kahn found that women of color start college at rates similar to their high school graduation rates; however, they do not continue on to graduate from college at the same rates.

In terms of participation in science and engineering fields, the discrepancy between white women and women of color was small: 19 percent of women of color who graduated from college majored in science or engineering, compared with 21.9 percent of white women. However, far fewer women of color continued on to get their Ph.D. in science or engineering—6.8 percent, versus 18.6 percent for white women (Figure 1).

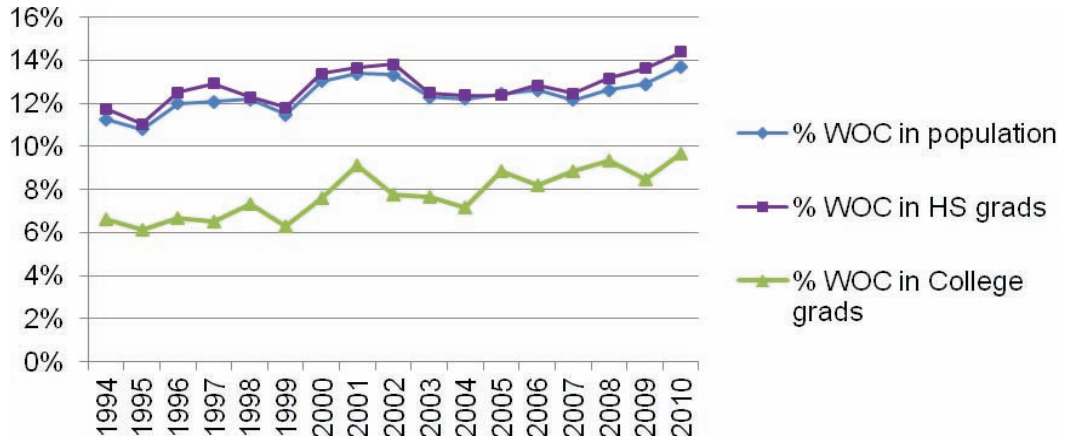

Figure 1 Percentage of US citizens ages 24-25 who are women of color (WOC) out of the total population of 24-25 year-old citizens, the high school graduates among the 24-25 year-old citizens, and the college graduates among the 24-25 year-old citizens.
Source: 1994–2010 Outgoing Rotations of the Current Population Survey.

Once women of color obtain a Ph.D., how do they fare in the academic workforce compared to white women? Ginther and Kahn examined women's career pathways at three types of institutions: minority-serving institutions, non-minority-serving institutions, and research-intensive universities. In terms of obtaining a tenure-track job within six years of obtaining a Ph.D., women of color were much more likely than white women to have tenure-track positions at minority-serving institutions; they were much less likely to have tenure-track positions at non-minority-serving institutions; and they were as likely to have tenure-track positions at research-intensive universities. Once women of color obtain a tenure-track job, they progress through the ranks--receiving tenure and attaining full professor--at rates approximately similar to white women.

The largest career difference occurs at the beginning of a faculty career, in obtaining tenure-track positions at institutions that are neither minority-serving nor research-intensive institutions. From that point forward women of color and white women are promoted at similar rates. Despite this, the representation of women of color in faculty positions remains at low levels, since they do not start down the tenure track at rates equivalent to white women.

Table 1 Percentage of Each Academic Rank In Each Race/Sex Category

	% of non-Tenure Track Faculty	% of Tenure-Track/ Tenured Faculty	% of Tenured Faculty	% of Full Professors	% of US Population
Women of color	5.1%	2.3%	1.7%	1.2%	12.5%
Black	2.3%	1.1%	0.7%	0.4%	6.2%
Hispanic	1.2%	1.0%	0.8%	0.7%	5.3%
Men of color	3.0%	4.1%	3.9%	3.8%	11.9%
Black	1.6%	1.8%	1.5%	1.2%	5.3%
Hispanic	1.1%	2.2%	2.2%	2.4%	5.6%
Other women	42.2%	26.1%	23.6%	20.1%	38.3%
White	38.5%	23.4%	21.9%	18.9%	36.2%
Asian	3.8%	2.6%	1.7%	1.2%	2.1%
Other men	49.6%	67.5%	70.8%	75.0%	37.3%
White	43.2%	60.1%	63.9%	67.4%	35.5%
Asian	6.5%	7.5%	6.9%	7.6%	1.9%
Total	100%	100%	100%	100%	100%
Total 2008 Number	15,473	85,164	62,469	36,365	

Notes: Percentages for people of color are also broken down for the two largest racial subgroups; percentages for other races are broken down into their two components. Note that the different academic rank groupings are not mutually exclusive; in particular, Tenure-Track/ Tenured Faculty includes Tenured Faculty (as well as untenured tenure-track faculty), and Tenured Faculty includes Full Professors (as well as Tenured Associate Professors).
SOURCE: 2008 NSF Survey of Doctorate Recipients (SDR). Finer racial distinctions have been suppressed to ensure the SDR's confidentiality as required by the NSF and as a result, Blacks and Hispanics do not add up to the total URM numbers. Calculations are based on weighted 2008 SDR data.

Overall, Ginther and Khan found that women of color are less likely than white women to:

- Graduate from college
- Obtain a Ph.D. in science and engineering
- Obtain a tenure-track job in a non-minority-serving institution

Women of color are more likely than white women to:

- Be employed in a non-tenure-track position
- Be employed at a minority-serving institution

However, those few minority women who do attain a tenure-track position at a research intensive institution are more likely than other groups to attain tenure.

To increase the diversity of faculty at U.S. higher education institutions, Ginther and Khan concluded that a top priority should be policies designed to increase college graduation rates among women of color. Interventions are also needed in the span of time between receiving a Ph.D. and obtaining a tenure-track job – a stage when representation of women of color drops a second time.

SYLVIA HURTADO: WORK-LIFE BALANCE AND SOURCES OF STRESS

How do the experiences of women of color who are faculty in STEM compare with those of other groups? Sylvia Hurtado, a professor at the University of California, Los Angeles, and director of the Higher Education Research Institute (HERI), responded to that question in her presentation and in a paper based on data from HERI's national faculty survey. The data represent 11,039 STEM faculty, including 272 women of color, at 673 four-year colleges and universities.

Hurtado's data showed that women of color (not including Asian women) were more likely to be in non-tenure-track positions—such as lecturer and adjunct positions—and less likely to be in full professorships than were other demographic groups. This means that women of color are disproportionately occupying positions that have the least power and authority in the academic context (see Table 2).

As a result of these discrepancies, faculty who are women of color often have few or no senior colleagues who are women of color in their departments or institutions, according to Hurtado. In fact, a major reason given by women for leaving STEM fields in academia is a lack of mentorship or guidance. A dearth of senior colleagues who are women of color reduces the access of early-career faculty to key social networks, wisdom for navigating the department and institution, and discipline-specific professional opportunities, noted Hurtado.

Sources of stress. Hurtado's research examined sources of stress reported by academics from different demographic groups. The following sources of stress were those most frequently reported by women of color:

- Lack of personal time (86.4 percent)
- Self-imposed high expectations (82.4 percent)
- Managing household duties (79.0 percent)
- Working with underprepared students (69.9 percent)
- Institutional budget cuts (66.0 percent)
- Personal finances (65.8 percent)
- Research or publishing demands (61.8 percent)

Neither white men nor white women reported personal finances as a stressor, whereas women and men of color did. White men reported less stress from lack of personal time, self-imposed high expectations, managing household duties, and institutional red tape. Overall, the stressors reported by white women and women of color were statistically similar; however, white women reported less stress than women of color from lack of personal time and managing household duties.

With regard to stress people experienced from discrimination, women experienced more than men, and Asian people and other minorities experienced more stress than white individuals. Over the course of their academic careers, women overall, and women of color specifically, experienced significantly more stress than their male counterparts, Hurtado found.

Workload. The different demographic groups reported similar workloads, with a few exceptions, Hurtado explained. Women of color did more student advising than white men, did more committee work than white men and Asian men, and were able to spend less time per week on research and scholarly writing—the primary basis for promotion—than men in all groups.

Work environment. When posed the statement "my research is valued by faculty in my department," women of color (69.7 percent) were less likely to agree than white men (79.3 percent) and Asian men (83.3 percent). To the statement "I have to work harder to be perceived as a legitimate scholar," women of color (79.1 percent) were more likely to agree than white women (66.6 percent), white men (52.3 percent), and men of color (60.1 percent).

Table 2 Proportion of STEM Faculty by Race/Ethnicity, Gender, and Academic Rank (n=11,039), by Percent

			Academic Rank				
Population	N	% of Sample	Professor %	Associate %	Assistant %	Lecturer / Instructor %	No Rank Data
URM women	272	2.5	16.2	24.6	31.3	23.5	4.4
Asian women	258	2.3	18.6	29.5	30.2	15.1	6.6
White women	3857	34.9	22.5	28.8	29.6	14.4	4.7
URM men	374	3.4	28.6	27.8	21.9	16.3	5.3
Asian men	565	5.1	30.8	24.1	28.8	6.5	9.7
White men	5713	51.8	41.8	26.3	17.8	8.6	5.5

Note: The categories for Latino, Native American, and African American have been collapsed into the category "underrepresented minority" (URM).
SOURCE: Sample based on data from the HERI Faculty Survey.

JOAN WILLIAMS:
BIASES FACED BY WOMEN OF COLOR

Joan Williams, distinguished professor of law and director of the Center for Work-Life Law at the College of Law, University of California, Hastings, discussed her work to bring together the academic literature on gender bias, including unconscious bias, and make it widely accessible. She also discussed her research group's efforts to expand the literature to include the experiences of people affected by gender and racial biases simultaneously, known as the double jeopardy. By illuminating these interpersonal and organizational patterns, Williams hopes to give people the tools to change the patterns and create more equitable workplaces.

Some of the biases that women face include the following, Williams said:

- **Attribution bias**, a discrepancy in explanations for why a person achieves success depending upon whether the person is female or male. Studies show that women's successes tend to be attributed to transient or external causes (e.g., luck), whereas men's successes are attributed to skill.
- **Recall and leniency biases**. Under the recall bias, women's mistakes are taken more seriously and remembered longer than those made by men. Under the leniency bias, objective rules are applied rigorously to women and leniently to men.
- **Polarized evaluations**. Exceptionally high achieving women receive higher evaluations than exceptionally high achieving men, while women whose performance is described as only "excellent" receive much lower evaluations than men performing similarly.

African American women are the recipients of two sets of negative competency assumptions simultaneously, Williams said, and so their mistakes tend to be judged more harshly than those of white women or of African American men. A particular bias faced by women of color is the "prove it again" bias: African American women are expected to fail, but when they do not fail, the reason is assumed to be charity rather than merit. Williams' preliminary research also seems to show that Hispanics are subject to assumptions of even lower competence than African American women and, in addition, are subject to the "immigration shadow"—the assumption that a person is a new immigrant, with the negative class and competence biases that assumption includes. Asian American women, in contrast, appear to experience a more complex stereotype; they tend to be viewed as either technically competent but lacking in leadership abilities, or as passive and therefore less competent.

Williams also described another form of bias—the "maternal wall," or gender bias triggered by motherhood. This is an order of magnitude stronger than any other form of bias, she said. Motherhood provokes very strong negative assumptions about an individual's competence and commitment. In a matched resume study, people applying for management consulting jobs submitted resumes that were identical except for four words—"membership in the PTA"—which implies parenthood. The results showed that women with this characteristic were 79 percent less likely to be hired, offered $11,000 less in salary, were seen as significantly less promotable, and were held to higher standards of performance and punctuality than women without the PTA designation. Williams' research group is in the process of gathering and analyzing data on how the maternal wall affects women of different races and ethnicities. For example, she has preliminary evidence that women of color experience push-back for taking the same family leave that is taken by white women without outsider comment.

DISCUSSION ON DATA NEEDS AND COMPLEXITIES

Understanding the status of women of color in academia and taking informed steps to improve it depend upon having reliable data. Throughout the conference, two contrasting perspectives on data needs were expressed often by participants: (1) The key data points have been known for quite some time, and the primary need now is to act on them; (2) Even though we have good data and should act on them, we nonetheless lack important data points and types of data that are needed to inform future efforts. For example, when the data show a drop in the number of women of color between college graduation and completing a Ph.D., it is not known whether the "missing individuals" began graduate programs and dropped out or whether they did not enroll in the first place.

Individual conference participants identified a number of needs for additional data, including:

Data disaggregated by race/ethnicity and gender, in order to see more clearly into the specific experiences of different groups of women. This need conflicts with the need to aggregate data in order to protect survey respondents' anonymity.

Longitudinal data tied to multiple factors simultaneously: individuals in the training period (e.g., students, graduate students, and postdocs) as well as academic institutions (e.g., programs and policies; rates of recruiting, enrolling, and supporting students of color).

Qualitative data that add nuance to the quantitative data (e.g., data on individuals' choices and career patterns, and about institutions' climate, practices, and policies).

Better response rates from women of color and people in other potentially disadvantaged groups. Some participants pointed to the difficulties of gathering critical information from these individuals because of to their small numbers in academia. Many women of color are the only woman of color in their department or subdiscipline at the national level. Often they may not respond to surveys or may choose not to provide identifying information because they are concerned that they may be identified by doing so and their responses may become public.

SUCCESSFUL PRACTICES OF FEDERAL AGENCIES AND UNIVERSITIES

Federal agencies are actively promoting women of color in science and engineering fields through investments that bolster institutional reform and pave the way for retaining and advancing outstanding women of color in US universities. Examples include: the National Science Foundation (NSF)'s distribution of more than 1,000 new awards to women under the American Recovery and Reinvestment Act 2009; the formation by the National Institutes of Health (NIH)'s Working Group on Women in Biomedical Careers of a Women of Color Research Network to provide networking, mentoring, and career development activities; and the National Aeronautics and Space Administration (NASA)'s efforts on Title IX compliance review.[1] At the conference, representatives from NASA, NSF, NIH, and the Environmental Protection Agency (EPA) shared programs and potential solutions to diversifying the science, engineering and health workforce within the agency as well as supporting women of color in academia.

Representatives of minority-serving and non-minority-serving institutions also shared strategies and practices they have implemented to advance institutional transformation.

[1] NASA (2009). Title IX & STEM: Promising Practices for Science, Technology, Engineering & Mathematics.

Box 1 NIH Working Group on Women in Biomedical Careers

The NIH Working Group on Women in Biomedical Careers includes several committees, each of which was charged with considering the impact on women of color in its area of focus. The Working Group includes the Women of Color Committee and the Women of Color Research Network (www.wocrn.nih.gov), which is a clearinghouse and a forum where scholars share information about role models, resources, and research on women of color in science and technology. The Women of Color Research Network is open to all people concerned about diversity.

Box 2 University of Michigan

James Wayne Jones from the University of Michigan described its efforts to increase the effectiveness of recruiting and retaining women faculty, improve the institutional climate, and increase the visibility and leadership of women, with support from the NSF-funded ADVANCE program. Two activities that have been particularly successful are: the engagement of senior faculty in the Strategies and Tactics to Increase Diversity and Excellence (STRIDE) program; and increased and immediate investment in the talented new hires through mentoring and training provided by various Launch Committees.[1]

[1] For more information about Launch Committees in the University Michigan, visit http://sitemaker.umich.edu/advance/launch_committees.

Box 3 Jackson State University

Loretta Moore from Jackson State University spoke about the university's success with the NSF ADVANCE Program, which began in 2010 and focused specifically on women of color at a minority-serving institution. She highlighted three of the program initiatives, including:

- Summer Writing Retreat, to allow faculty to focus on their roles as scholars and support their advancement through the academic ranks;
- International Group Travel, to give US-born faculty rich international experiences, build mentoring relationships, and foster international research collaboration; and
- Bias Education Initiative, to help women of color address the challenges of balancing multiple responsibilities and expectations in the context of unconscious bias.

Box 4 Harvard Medical School

Joan Reede represented the Harvard Medical School and mentioned that the number of underrepresented minority faculty has risen from 185 in 1990, when the Office for Diversity of Inclusion was established, to 630 in 2012. The Office is now looking at the productivity of faculty, assessing their advancement with regard to academic progression and leadership/awards as well as retention. She emphasized the importance of considering the individual in the context of the institution, the department, and the discipline; therefore Harvard Medical School aims at not only increasing the numbers, but more importantly, increasing its capacity to capture all human capital and make maximum use of the contributions of all community members.

WRITTEN TESTIMONIES FROM PROFESSIONAL SOCIETIES

Many professional societies have designed policies and programs to support women of color in academia. A large number of societies (25) provided written testimonies before the conference on their programs and policies, included in an appendix to the report. As part of their written testimonies, some societies provided data on representation of various demographic groups in their fields. For example, the American Mathematical Society included data on the gender breakdown of mathematics faculty in various appointment categories, including information on race and ethnicity (See Table 3).

The written testimonies revealed that many particular practices regarding women of color have been undertaken by multiple professional societies. Table 4 and Table 5 detail some of these practices and recommendations provided by the societies.

SHIRLEY MALCOM: CLOSING REMARKS

Shirley Malcom, head of the Directorate for Education and Human Resource Programs at the American Association for the Advancement of Science (AAAS) and co-author of The Double Bind: The Price of Being a Minority Woman in Science, offered remarks to close the conference, beginning with an illustration of the power of context. She related a comment by a scientist working at the International Centre for Theoretical Physics in Trieste, Italy, who remarked that Trieste is the only place where, when a black man walks down the street, people assume he is a scientist.

Malcom described her view of how individuals and institutions may move from addressing barriers faced by talented women of color in a piecemeal fashion to a strategy that is holistic. Calling forth a football metaphor, she urged her audience to gain a nuanced understanding of the game they are in. She described how football players employ both play

Table 3 Percentage of gender and of racial/ethnic groups among all tenured, tenure-eligible, postdoctoral and other full time faculty in mathematics departments of four-year colleges and universities in fall 2010.

Mathematics Departments	Asian	Black, not Hispanic	Mexican American/ Puerto Rican/ other Hispanic	White, not Hispanic	Other/ Unknown
	percent	percent	Percent	percent	percent
Tenured Men	6	1	1	36	1
Tenured Women	1	0	0	10	0
Tenure-eligible men	2	0	0	7	0
Tenure eligible women	1	0	0	4	0
Postdoctoral men	1	0	0	2	0
Postdoctoral women	0	0	0	1	0
Full-time men not included above	1	1	0	10	1
Full-time women not included above	1	0	0	9	1
Total full-time men	9	2	2	56	2
Total full-time women	3	1	1	23	1

Notes: The column "Other/Unknown" includes the federal categories Native American/Alaskan Native and Native Hawaiian/Other Pacific Islander. 0 means less than half of 1 percent and this may cause apparent column sum inconsistencies.

Table 4 Practices of professional societies to increase participation of women of color, based on written testimonies, in order of frequency[a]

1	The establishment of boards and committees (including diversity office) within its governance structure to focus on issues of women of color and address their challenges.
2	The creation of professional development programs (including mentoring programs).
3	The creation of programs and awards that support women of color by providing travel funds, scholarships, research grants, etc.
4	The promotion, endorsement, and conduct of surveys and studies to improve the collection and evaluation of data on women of color.
5	The inclusion of "diversity" in the professional societies' mission, core value and strategies.
6	Programs to help improve institutional climate in academia, to initiate, or to sponsor diversity events.
7	The development of partnership among professional societies, with federal agencies, universities and other entities.
8	Engagement students in the pipeline and increase recruitment and retention.
9	Recognition of women of color's achievement and accomplishments; and encouragement nominations of women of color for awards/memberships.
10	The integration of trainings and networking opportunities into the societies' meetings.
11	The engagement of women of color in leadership positions.
12	Federal programs to increase recruitment and retention of women and minority workforce.
13	Dissemination of effective practices and successful program experiences

[a]This summary is based on information distilled from the written testimonies as described in Appendix E-1 of the report. It does not include programs or policies that were not mentioned in the written testimonies. The list is ranked in order of the frequency with which a practice was mentioned in the written testimonies.

Table 5 Recommendations from professional societies to increase participation of women of color, based on written testimonies, in order of frequency[a]

1	To better collect and report data, and to have more funding available for research related to women of color in STEM.
2	To have better and more mentoring (including more resources for building the mentoring network), and to provide role models.
3	To build, develop and sustain a community for women of color.
4	To build awareness of the issues related to recruitment, retention and advancement of women of color in STEM, and to call for attention on the issues from the entire institution.
5	To focus on the pipeline and attract younger generation to major in STEM and pursue a STEM career; to facilitate the critical transitions for students and faculty (e.g., from undergraduate to graduate, from students to professionals).
6	To engage more women of color in leadership positions; to improve self-empowerment; and to recognize women of color's accomplishments and achievements.
7	To develop and improve work-life balance policies in academia (e.g., flexible working hours, supplements to maternity leave).
8	To reward and recognize institutions or individuals that support women of color.
9	To engage various stakeholders in the conversation (professional societies, industry, government and academia).
10	To identify, highlight, and disseminate model programs and best practices for maximizing talent of women of color.
11	To ensure the diversity component of committees, conference speakers, and prize nominations.
12	To continue federal funding programs (e.g., NSF ADVANCE program), and to gain financial support for meetings, workshops, travel, etc.
13	Federal agencies to establish compliance programs to conduct compliance reviews of their grantees.

[a] This summary is based on information distilled from the written testimonies as described in Appendix E-1 of the report. The list is ranked in order of the frequency with which a recommendation was mentioned in the written testimonies.

books and game plans. In academia, play books are being used, increasingly and to some benefit. But accumulating successes will happen only when individuals and institutions pull together a game plan. Interventions to maximize American talent by advancing talented women of color must be selectively and wisely employed according to the context and climate of each institution.

Malcom also stressed the importance of professional societies, and she urged women of color to be visible in their professional, disciplinary contexts. AAAS has attempted to make its meetings (functionally) smaller in order to create communities within the larger professional community. It does so by hosting networking events for specific groups of people, including for women of color.

As game plans go, Malcom held a high view of the NSF-funded ADVANCE program, as it requires taking a holistic view of the institution. Malcom had a series of comments for multiple audiences about the plays contained in the academic playbook of interventions for maximizing American talent:

- **There is a need for data disaggregated** by race, sex, discipline, citizenship, and other traits, because we cannot change what we do not understand.
- **Mentors, sponsors, and coaches are critical.** Today, young women of color do not have to become something they have never seen. Senior women have a responsibility to make the path visible and easier for junior scholars.

- **We encourage publications by encouraging publishing with others** as well as building broader partnerships.
- **Scholars must make and nurture professional connections.** Women of color must regularly attend the major conferences in their fields and expand their professional networks.
- **Women of color in tenure-track positions must make sure that they understand the policies and procedures that will guide their advancement** in the academic, institutional community. They must ask senior faculty and department chairs about the requirements for moving to the next level and taking a leadership role within the department.
- **Institutions need to ensure that the selection of faculty is more equitable** throughout the recruitment and advancement processes.

In addition, Malcom listed the following points as needing immediate attention in order to increase the nation's ability to capture the intelligence and creativity of its top talent, upon which America's scientific and technological strength depends:

- **The importance of career transition points**—and their weaknesses—in the education and careers of talented women of color.
- **The need for transparent institutional policies**—for example, in hiring and promotion.
- **The need to raise awareness of unconscious biases.**
- The twin needs to (1) **obtain focused, additional data** (qualitative as well as quantitative), and (2) **move ahead to solutions knowing what we know.**
- **The need for federal agencies to fund more research on gender and/or race** targeting select populations.
- Overall, **the need for a "toolkit" that can be customized** to each institutional and personal context.

Malcom concluded by framing the issues at hand in terms of differentism, citing research that found that some prejudices or reactions are not conscious but are the result of the brain and gut operating independently. She noted that the "universal tendency [is] to form coalitions and favor our own side."

A key issue, then, is how the academic community moves from differentism to seeing one another as familiar. There are many steps along that path. Malcom described how women of color need to be visible and to participate. They must insist on certain kinds of behaviors—that the institutions that fund research, honor researchers, and maintain disciplines' status behave in such a way that outstanding women of color are included and are a part of creating and sharing knowledge.

Malcom called on talented women of color to remain present and continue contributing, to bring forth a world of science and technology where differentism dissolves, members of academia see one another as familiar, and familiar and talented are one and the same.

COMMITTEE ON ADVANCING INSTITUTIONAL TRANSFORMATION FOR MINORITY WOMEN IN ACADEMIA

(Affiliations and titles listed at the time of the project period)

LYDIA VILLA-KOMAROFF, Co-Chair, Chief Scientific Officer, Cytonome/ST, LLC

FLORENCE BONNER, Co-Chair, Senior Vice President, Research and Compliance, Howard University

JOAN W. BENNETT (NAS), Professor, Department of Plant Biology and Pathology, Rutgers University

ALICIA CARRIQUIRY, Professor of Statistics, Iowa State University

ANTHONY DEPASS, Assistant Vice President, Research Development, and Director, MBRS RISE Program, Long Island University

JOSEPH M. DESIMONE (NAE and NAS), Distinguished Professor of Chemistry and Chemical Engineering, The University of North Carolina at Chapel Hill

JOSEPH S. FRANCISCO (NAS), Distinguished Professor of Chemistry and Earth and Atmospheric Sciences, Purdue University

SYLVIA HURTADO, Professor and Director, Higher Education Research Institute, University of California, Los Angeles

VIVIAN W. PINN (IOM), Senior Scientist Emerita, Fogarty International Center, and Former Director (Retired), Office of Research on Women's Health, National Institutes of Health

PROJECT STAFF

Catherine Didion, Study Director

Donna K. Ginther, Consultant

Shulamit Kahn, Consultant

Wei Jing, Research Associate

Sara Frueh, Communications Writer

Karin Matchett, Rapporteur

THE NATIONAL ACADEMIES™

Advisers to the Nation on Science, Engineering, and Medicine

The nation turns to the National Academies—National Academy of Sciences, National Academy of Engineering, Institute of Medicine, and National Research Council—for independent, objective advice on issues that affect people's lives worldwide.

www.national-academies.org