

Standing Our Ground

A Guidebook for STEM Educators
in the Post-Michigan Era

Shirley M. Malcom

Daryl E. Chubin

Jolene K. Jesse

American Association for the Advancement of Science
National Action Council for Minorities in Engineering

October 2004



ADVANCING SCIENCE, SERVING SOCIETY



Acknowledgment

AAAS, NACME, and the authors of this report are indebted to over 180 colleagues who participated in the January 2004 conference, and to another 20 who contributed case materials and reviewed various pieces of what follows. None of them is acknowledged by name. The climate of intimidation that dominates discussions of policies and programs today on the issue of inclusion (commonly referred to as “affirmative action”) makes it imprudent and risky to highlight their participation lest they and their institutions become subject to harassment and the targets of critics. Many believe that our problems are over and the need for special efforts is long past. The data belie those beliefs; educational preparation and opportunity are not yet evenly distributed by race, ethnicity, gender, and geography. This guidebook can help level the playing field, but we are far from that state of grace. An exception to our anonymous acknowledgment is a hearty thank-you to the Alfred P. Sloan Foundation (grant no. 2004-6-12), which funded the conference, and in particular, to Dr. Ted Greenwood, Program Director.

Disclaimer

The interpretations and conclusions contained in this guidebook are those of the authors and do not represent the views of the AAAS Board of Directors, its Council, and membership; the NACME Board of Directors; or the Alfred P. Sloan Foundation.

Printed in the United States of America
ISBN 0-87168-699-6

©Copyright 2004

American Association for the Advancement of Science
AAAS Center for Advancing Science & Engineering Capacity
1200 New York Avenue, NW
Washington, DC 20005 USA

Layout by AAAS Publication Services
Cover by Ann Williams, AAAS EHR

About AAAS

The American Association for the Advancement of Science (AAAS) is the world’s largest general scientific society, and publisher of the journal, *Science* (www.sciencemag.org). AAAS was founded in 1848, and serves some 265 affiliated societies and academies of science, serving 10 million individuals. *Science* has the largest paid circulation of any peer-reviewed general science journal in the world, with an estimated total readership of one million. The non-profit AAAS (www.aaas.org) is open to all and fulfills its mission to “advance science and serve society” through initiatives in science policy; international programs; science education; and more. For the latest research news, log onto EurekAlert!, www.eurekalert.org, the premier science-news Web site, a service of AAAS.

About NACME

Since 1974, NACME (the National Action Council for Minorities in Engineering) has provided leadership and support for the national effort to increase the representation of successful African American, American Indian and Latino women and men in engineering and technology, math- and science-based careers. For details on NACME programs, partners and sponsors, see www.nacme.org.

Table of Contents

Foreword.....	5
Acronym List.....	7
Introduction.....	9
Legal Primer.....	13
Design Principles.....	31
Appendices.....	45
A Report of the Joint AAAS/NACME Conference.....	45
Select Data Compendium.....	55
B Conference Agenda.....	65
Setting the Stage – Timeline.....	67
The Beauty of Diverse Talent – Shirley Ann Jackson.....	69
Science, Technology, and America’s Future – C.M. Vest.....	73
C Background Readings.....	81
Reprint: “The Long Road to Race-Blindness” (<i>Science</i> , vol. 302, Oct. 24, 2003) – Thomas J. Kane.....	83
Authors’ Biosketches.....	87
D Responses to Freedom of Information Act Requests.....	89
Index.....	93

Foreword

The phone rings at 8:00 AM one Thursday. The call is from the office of the university counsel. They want to see you as soon as possible about a letter just received that raises questions about minority-focused programs, including the program you run to bring more minorities into the College of Engineering.¹

You knew this was coming; similar letters had been received by friends and colleagues who run programs in other institutions. Their counsels are advising that the programs be opened to all students. Before your program began there were few applications from minority students, low retention of those few who did enroll, and mediocre performance by those who remained to graduate. After 20 years of effort all of those trends have been reversed: progress is being made, though not nearly enough to warrant abandoning the program. Could it really be dismantled? Your first reaction is panic, followed by anger and then confusion. You think, “How can this be happening? I thought the Michigan decisions affirmed the value of diversity.”

While the specific event described is fictional, it is based in fact. Program implementers are being challenged about their initiatives. Universities are changing participation requirements beyond what might be needed to satisfy the letter and spirit of the Supreme Court rulings in *Gratz v. Bollinger* and *Grutter v. Bollinger*. Race-conscious decision making is allowed under certain circumstances. Race-neutral strategies must be considered but *do not have to be adopted* if program goals cannot be achieved using these. Research findings challenge the effectiveness of most of these strategies,² and the embrace of many have yielded perversions that defy logic. Some coun-

sels have advocated giving ground to avoid lawsuits; others down the road, in institutions with similar initiatives, have chosen to stand pat.

While the fictional encounter *could have* happened, an incident that *did* occur was much more troubling. An administrator in a major public university system bemoaned the slow rate of change to the makeup of the science and engineering faculties at her institution. She acknowledged that it was hard to change the situation since special efforts at outreach and recruitment of persons to apply for such positions could not be undertaken. We pointed out that this was not so and that, in fact, since the university was a federal contractor, it was subject to Executive Order 11246, which means that it had included a standard “equal opportunity clause” in each of its nonexempt contracts. Under this standard clause, the university must develop an Affirmative Action Plan that includes an analysis of the utilization or underutilization of minorities and women. Essentially, the Executive Order *required* that efforts be undertaken to employ a diverse faculty. The campaign of intimidation has indeed succeeded when *supporters* of diversity on campuses surrender their rights in the confusion of what is legally permissible, or, in this case, what is required.

Perhaps if more post-*Grutter* and -*Gratz* guidance had been forthcoming from the Bush Administration, such as that provided to universities after the Bakke decision, there might be less confusion and more consistent behavior. But as of the writing of this document, such guidance has not been offered. Instead, the Administration, through the Department of Education’s Office of Civil Rights, has issued two dif-

ferent papers on “race neutral alternatives.” They comprise only a piece of the overall strict scrutiny analysis in which a university employing race-conscious decision making must engage. Moreover, the Administration offers advice concerning these race-neutral alternatives to the exclusion of any other approaches in the face of research to the contrary. This research suggests that so-called alternatives (such as the Texas 10% “solution”) look less and less each day like viable alternatives if the goal is diversity and fairness.

Standing Our Ground seeks to provide practical advice based on the specific nature of the problems of bringing minorities into science, technology, engineering and mathematics (STEM), the details of the types of programs developed to address the problems, and the significance of the opinions rendered by the Supreme Court. This document does not offer legal advice. But data, research, and anecdotes needed to inform legal advice are provided. Strategies undertaken and language adopted by other institutions are shared. Readers are advised to conduct a careful analysis of individual program components. The discussion that follows will inform that analysis.

Rather than simply give up effective programs that can be sustained within the bounds provided by the Supreme Court, university leaders need to determine how important diversity really is to the educational missions that they pursue. A white male engineering student, for example, will be greatly disadvantaged if he enters the corporate world unaware of and unprepared to work in a multicultural team environment, being asked to develop products for a diverse market. A white medical student who has few opportunities to interact with minority classmates, has not acquired some level of cultural competence, or come to a practical rather than just an intellectual understanding of health disparities, will lack insights critical for treating a shifting patient-client base.

Any students who do not have the experiences of education with men and women of different races and ethnic backgrounds in the long term will be short-changed. As we all learn to live together, learn together, create together, work to build a diverse America, realizing our democratic ideals, let us resolve that it is time to stand our ground.

Shirley M. Malcom
Daryl E. Chubin
Jolene K. Jesse

ENDNOTES

1. See sample letter sent by National Association of Scholars in Peter Schmidt, “Foes of Affirmative Action Push Colleges to Reveal Policies on Race-Conscious Admissions,” *The Chronicle of Higher Education*, Mar. 23, 2004, and Appendix D, this report.
2. References are cited throughout the sections that follow.

Acronyms

AAAS	American Association for the Advancement of Science	HENAAC	Hispanic Engineers National Achievement Awards Ceremony
ACCESS	Achieving Competence in Computing, Engineering, and Space Science, NASA program	MSIs	minority-serving institutions
ACE	American Council on Education	NACME	National Action Council for Minorities in Engineering, Inc.
ADA	Americans with Disabilities Act of 1990	NASA	National Aeronautics and Space Administration
AGEP	Alliances for Graduate Education and the Professoriate, NSF program	NIGMS	National Institute of General Medical Sciences, NIH
AISES	American Indian Science & Engineering Society	NIH	National Institutes of Health
CAWMSET	Commission on the Advancement of Women and Minorities in Science, Engineering, and Technology Development (Morella Commission)	NSBE	National Society of Black Engineers
DBE	Disadvantaged Business Enterprise, U.S. Department of Transportation program	NSF	National Science Foundation
DOD	U.S. Department of Defense	OCR	Office of Civil Rights, U.S. Department of Education
DOT	Department of Transportation	SACNAS	Society for Advancement of Chicanos and Native Americans in Science
EEOC	Equal Employment Opportunity Commission	SBA	Small Business Administration
ELC	Eligibility in Local Context, University of California System	SEEOA	Science and Engineering Equal Opportunity Act of 1980
GEM	National Consortium for Graduate Degrees for Minorities in Engineering and Science, Inc.	STEM	science, technology, engineering, and mathematics

Introduction

A momentous day for the future of education in America was June 23, 2003. On that day, the United States Supreme Court sanctioned what has been known for decades in higher education admissions offices, in corporate board rooms, and even in military service academies: in this country, diversity can be an essential component of excellence in education. Granting constitutional legitimacy to educational policy makers' pursuit of this ideal is not only respectable as a matter of equity under the law, but is actually *essential*. Changing demographic patterns and national priorities demand that America fully utilize its greatest resource—its citizenry. Educational policy makers get it. And finally, the U.S. Supreme Court does, too.

Though many in the higher education community lauded the announcement of the *Grutter v. Bollinger*¹ and *Gratz v. Bollinger*² decisions as a victory for diversity and academic freedom, in the aftermath of the decisions, the persistent ambiguity that has plagued this area of the law has begun again to rear its ugly head. What do the Supreme Court decisions mean for institutions that use race-conscious decision-making in financial aid assessments and outreach efforts in their pursuit of a diverse class? What do they mean for institutions sponsoring minority-exclusive activities, such as recruitment overnights or academic enrichment programs? Perhaps the most urgent question is: what do these decisions mean for institutions outside of the higher education community, including K-12 public and private schools, charter schools, non-

profits, and even business and industry. In other words, what do the decisions *really* mean?

Historically, the federal government (most often the Justice Department) has assisted institutions seeking to wade through the legal morass created by significant, but confusing landmark cases.³ For example, after the 1978 *Bakke*⁴ decision, the Department of Health, Education and Welfare took the lead in presenting the Administration's interpretation of the decision, and clearly setting forth guidelines regarding the permissibility of affirmative action activities.⁵ Similarly, after *Adarand v. Peña*,⁶ the Justice Department issued swift policy guidance about the permissibility of affirmative action components of federal programs, created an interagency working group, and directed the general counsels of all federal agencies to review their programs for compliance.⁷ In the civil rights arena, the Department of Education's Office of Civil Rights (OCR), as part of its stated mission, is charged with ensuring equal access to education throughout the nation through vigorous enforcement of civil rights laws. As part of this mission, OCR regularly provides technical assistance to help institutions achieve voluntary compliance with these laws. Indeed, knowing that affirmative action law is often murky, OCR issued in 1994 policy guidance discussing the applicability of Title VI's nondiscrimination requirements to programs awarding financial aid on the basis of race (in whole or in part).⁸ Yet it has been over a year since the Michigan cases, and even OCR remains silent, with one repeated

exception: race-neutral alternatives.

University counsels, who in the past have commonly sought federal guidance, are now coming up short. “So far the Bush Administration has had very little to say about the Michigan decision and there is no indication that the Administration has undertaken a review of policy.”⁹ Accordingly, various nongovernmental groups—both opponents and proponents of affirmative action—are poised to fill this void.¹⁰

Among those groups are the American Association for the Advancement of Science (AAAS), whose mission is to advance science and innovation, in part, by fostering education in science and technology for everyone, and the National Action Council for Minorities in Engineering (NACME), whose mission is to support the national effort to increase the representation of successful African American, Indian, and Latino women and men in engineering and technology, math and science-based careers. In fact, because of their particular missions, AAAS and NACME are especially well situated to clarify for a national audience the heightened importance of diversity to science and engineering related fields. AAAS and NACME have long recognized that the affirmative action and human resource development needs of our nation are magnified in the specific context of education in science, technology, engineering and mathematics (STEM).

The case for diversity in STEM fields has been well articulated in the last several years. Leading economists have identified scientific and technological progress as the single most important determining factor in U.S. economic growth, accounting for as much as half of the Nation’s long-term growth over the past 50 years.¹¹ The Science and Engineering Equal Opportunity Act of 1980, signed by President Carter in December 1980, recognized the need for the development of more domestic talent in STEM fields over twenty years ago. That law states, “it is in the national interest to promote the full use of human resources in science and engineering and to insure the full development and use of the scientific and engineering talents and skills of men and women, equally, of all ethnic, racial, and economic backgrounds.”¹² This act gives the National Science Foundation a congressional mandate to pursue diversity in STEM fields.

In the mid-1990s, the Hart-Rudman Commission—with Newt Gingrich as its predominant spokesman—found that the number-two threat to American national security is the failure to invest adequately in science and to ensure that science and math education produces enough young Americans to actually do the science that is needed.¹³ The shortage of American talent in STEM fields was also cited by the Congressional Commission on the Advancement of Women and Minorities in Science, Engineering and Technology Development (CAWMSET), headed by former Republican Congresswoman Constance Morella, in its September 2000 report, *Land of Plenty: Diversity as America’s Competitive Edge in Science, Engineering and Technology*. The report intoned that “if women, underrepresented minorities, and persons with disabilities were represented in the U.S. science, engineering, and technology workforce in parity with their percentages in the total workforce population, this shortage [of skilled American workers] could largely be ameliorated.”

Arguments about shortages aside, as we experience wide-ranging changes in demographic patterns in this country, the imperative to include more *diversity* in our STEM workforce becomes even more immediate. Recent articles and special issues in the popular media, from *Business Week* to *Congressional Quarterly*, have revved up the discourse on the importance of STEM to our national economic growth and the need to ensure a scientifically and technologically savvy workforce. Department of Defense (DOD) spokesperson Ronald Sega, in a speech before the Congressional Black Caucus, also outlined the fact that DOD can neither rely on foreign workers nor outsource its STEM needs to foreign countries. So there are major sectors of our government and industry whose only options are to utilize our own STEM talent. If we don’t act now to incorporate marginalized groups into a dynamic STEM workforce, we risk endangering our economic and national security well into the future.

On January 15–16, 2004, AAAS and NACME hosted a conference and work sessions to consider the effect of the *Grutter* and *Gratz* opinions on STEM education and outreach programs. Researchers and program implementers leading efforts to increase

participation of women, minorities and persons with disabilities within science, engineering, mathematics, technology and health fields met to discuss their current initiatives to encourage access and inclusion, to reaffirm the value of diversity in education, and to design strategies for incorporating diversity into the missions of their respective universities and organizations. Over 180 members of the STEM education community, government agencies, and private industry attended. The workshop proved to be a timely opportunity for exchanging valuable information, and planning new actions.

This document is, in part, a report of the proceedings of this important conference. However, because the conference revealed a great deal of uncertainty in the STEM community on achieving diversity in a constitutionally permissible manner, the document also attempts to formulate the workshop findings in a “guidebook” format that is both comprehensive and useful for STEM diversity practitioners. While this document does not offer legal advice, it does provide data on opportunities and constraints, insight into possible strategies, and guidance and inspiration for program implementers as they work with their legal counsels to apply the *Grutter* and *Gratz* rulings to their ongoing activities.

ENDNOTES

1. *Grutter v. Bollinger*, 539 U.S. 306 (2003)
2. *Gratz v. Bollinger*, 539 U.S. 244 (2003)
3. “The Bush Administration v. Affirmative Action: Justice Department Drags Feet on Upholding Court Ruling,” Report of the Citizens’ Commission on Civil Rights, pp. 1 & 3. December 2003.
4. *Regents of the University of California v. Bakke*, 438 U.S. 265 (1978).
5. Report of Citizens’ Commission on Civil Rights at 4.
6. *Adarand Constructors, Inc. v. Peña*, 515 U.S. 200 (1995).
7. Report of Citizens’ Commission on Civil Rights at 4-5.
8. Notice of Policy Guidance, Federal Register, Vol. 59 No. 36 / Wednesday, February 23, 1994. This policy guidance is perhaps the single most important recitation of nondiscrimination law and its intersection with race-based affirmative action in providing financial aid. It remains in effect today.
9. Report of Citizens’ Commission on Civil Rights at 5.
10. Compare the website of the Center for Equal Opportunity, <http://www.ceousa.org/>, (detailing this anti-affirmative action organization’s strategy of filing OCR complaints against various universities over their affirmative action policies) with the website of the College Board, <http://www.collegeboard.com/highered/ad/ad.html>, (offering a “Strategic Planning and Policy Manual Regarding Federal Law in Admissions, Financial Aid and Outreach” prepared by education law experts for administrators to utilize toward “achieving diversity in higher education.”)
11. Robert Solow, *Growth Theory: An Exposition* (New York: Oxford University Press, 1987); and Alan Greenspan, “Technology and the economy,” Remarks to the Economic Club of New York, Jan. 13, 2000.
12. Science and Engineering Equal Opportunities Act of 1980.
13. As stated in the Phase III Report of the U.S. Commission on National Security/21st Century, *Road Map for National Security: Imperative for Change*, Feb. 15, 2001, “we can think of nothing more dangerous than a failure to manage properly science, technology, and education for the common good over the next quarter century” (p.30).

Affirmative Action—A Legal Primer

Just as the January conference began with an elaboration of the Supreme Court findings in the context of the overall legal environment related to affirmative action, so too does this Guidebook.

Legalese has become an unfortunate reality for higher education administrators struggling to achieve diversity in their human resource development efforts. “Strict scrutiny,” “narrow tailoring,” “compelling state interest,” “Title IX,” “Title VI,” “Title VII,” “equal protection,” “critical mass,” and “race-neutral alternatives” are just a few of the terms that have barged their way into the vocabularies of well-intended program implementers who are trying to navigate their institutions’ “Next Steps” through a risky post-*Michigan*¹ minefield. With much of the complicated discourse on this topic drafted by lawyers for lawyers, the administrators who really need to understand these terms-of-art and who are best equipped to analyze these standards in context are often overlooked. Legal commentators assume that laypersons can glean a full understanding of these terms by reading protracted litanies of summarized legal opinions. As members of the higher education community that we serve, we know that this assumption is often incorrect.

Even more challenging for program implementers in STEM fields is the fact that virtually none of these legal discussions considers the intricacies and particularities of the STEM disciplines, or the grave national consequences that will inevitably result if the United

States fails to act dramatically and affirmatively to fully develop and utilize its diverse citizenry in STEM disciplines.² Consideration of such data, in our view, could significantly change a decision on the sustainability of a particular STEM program. Therefore, we start our analysis with a clear and concise “affirmative action primer” of definitions, statutory and judicial principles, and paradigms with an emphasis on such principles related to the STEM enterprise. Our objective is that STEM program implementers can use this primer, in addition to (not instead of) conferring with expert legal counsel, to gain a more complete understanding of these legal terms. They can use this document along with counsel’s advice as a foundation on which to “stand their ground” as to the centrality—as a matter of law—of diversity in STEM human resources, not only to their institution’s particular mission, but also to the nation.

Federal Equal Opportunity Standards

Title VI, Title VII, Title IX and the A.D.A.

The following six laws constitute the major federal statutory equal protection and non-discrimination standards to which public and private institutions must adhere.

1. Title VI of the Civil Rights Act of 1964, 42 U.S.C. 2000d

(applies to private institutions that accept federal funding and to public institutions)

“No person in the United States shall, on the ground of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance.”

Equal Protection principles of the U.S. Constitution’s Equal Protection Clause (found in the 14th Amendment) apply through Title VI to private institutions that accept federal financial assistance.³ With the *Grutter* and *Gratz* decisions, both remediation of the present effects of an institution’s own past discrimination (the remedial rationale) and the achievement of student body diversity to create educational benefits for all students and to serve the nation (the diversity rationale) are acceptable rationales for taking race into account in college admissions.

2. Title VII of the Civil Rights Act of 1964, 42 USC 2000e-2

(applies to private nonexempt employers and state and local government employers) and Executive Orders 11246 and 11375 (apply to nonexempt federal government contractors)

It is illegal for an employer “to fail or refuse to hire or to ... discriminate against any individual with respect to his compensation, terms, conditions, or privileges of employment” on the basis of “race, color, religion, sex, or national origin.” 42 U.S.C. 2000e-2(a).

Title VII creates statutory standards for employment equity. Title VII has its own standards for affirmative action in hiring, including whether an institution is remedying the present effects of its own past discrimination or whether there is a “manifest imbalance” in the representation of women or minori-

ties in the workforce of the institution as compared with the representation of women or minorities in the available and capable labor pool.⁴ The Supreme Court has not yet decided whether the *Grutter* and *Gratz* diversity rationale will also apply to employment situations, and has not yet relied in the employment context on the principles of Equal Protection that apply under Title VI to educational programs.

3. Title IX of the Education Amendments of 1972

“No person in the United States shall, on the basis of sex, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any education program or activity receiving Federal financial assistance.”

Although most well-known for requiring equity in athletics, this law applies broadly to all public undergraduate programs, to all public and private graduate and professional school programs that receive federal financial assistance, and to all private education programs that are open to males and females and receive federal financial assistance. It generally takes an approach to non-discrimination and gender equity in programs that are open to males and females that is similar to the approach to race and national origin equity under Title VI.⁵

Expanded and Improved Title IX Enforcement and Compliance Policies

While women and girls still have further to go to reach full equality in athletics, much progress has been made over the past 30 years since implementation of Title IX. In light of this progress, in 2000 the U.S. Commission on Civil Rights issued a report entitled, *Equal Educational Opportunity and Nondiscrimination for Girls in Advanced Mathematics, Science, and Technology Education: Federal Enforcement of Title IX* recommending that Title IX enforcement authority be used more effectively to ensure that women and girls receive equal treatment and greater participation opportunities in math and science education programs.

Some policymakers and commentators have championed this view,⁶ and in July 2004, the Government Accountability Office issued a report entitled “GENDER ISSUES: Women’s Participation in the Sciences Has Increased, but Agencies Need to Do

More to Ensure Compliance with Title IX.”⁷ This report, requested by Senators Ron Wyden and Barbara Boxer, assesses what federal agencies do to ensure that grant recipients comply with Title IX in STEM fields, what data show about women’s participation in these fields, and what promising practices exist to promote their participation.

The argument for utilizing Title IX enforcement strategies more aggressively to ensure greater participation by women in the sciences is promising, but needs further exploration and ultimately more widespread support. We encourage math and science program implementers to approach their university counsel with the possibility of using the statutory and regulatory authority of Title IX as a justification for developing and expanding gender equity programs in math and science.⁸

4. Americans With Disabilities Act, 42 U.S.C. §§ 12101 *et seq.*

The Americans with Disabilities Act (ADA) was signed into law on July 26, 1990. The ADA’s intent is to make American society more accessible to people with disabilities. It gives civil rights protections to individuals with disabilities. The ADA furthers equal opportunity for individuals with disabilities in public accommodations, employment, transportation, education, transportation, health services, voting, and public services, and communications.

5. Section 504 of the Rehabilitation Act, 29 U.S.C. § 794

“No person with a disability in the United States shall, solely by reason of her or his disability, be excluded from the participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance or under any federal program or activity conducted by the federal government.”

6. Age Discrimination Act, 42 U.S.C. §§ 6101-6107)

“No person in the United States shall, on the basis of age, be excluded from participation, in be denied the benefits of, or be subjected to discrimination under, any program or activity receiving Federal financial assistance.”

Equal Protection & Due Process Clauses

The following two clauses from the United States Constitution apply to public institutions and, through Title VI and Title IX, to private institutions that accept federal funding.

1. Equal Protection Clause of the 14th

Amendment

“[No state shall] deprive any person of life, liberty, or property, without due process of law; nor deny to any person within its jurisdiction the equal protection of the laws.”

2. Due Process Clause of the 5th Amendment

“[No person shall] be deprived of life, liberty, or property, without due process of law.”

Varying Levels of Judicial Scrutiny Given to Race/Gender Conscious Measures

When a government actor makes a decision that confers benefits or burdens based on a person’s status or membership in a particular group or class, e.g., race, gender, or age, and that decision is challenged, the legality of the decision must be analyzed under one of three levels of judicial scrutiny—strict, intermediate, or weak.

1. Strict Scrutiny⁹

Race-conscious decisions made by the government are generally subject to strict scrutiny to determine if they are constitutional under the Equal Protection Clause of the Constitution. The government must show that the race-conscious decision or program is necessary to achieve a compelling governmental interest (such as achieving the educational benefits of diversity so as to further a university’s educational mission), and that the decision is narrowly tailored to advance that interest.

This standard applies, through Title VI of the 1964 Civil Rights Act, to private institutions that receive federal financial assistance when race-conscious decisions made by these institutions are challenged.

Compelling Interest

The initial inquiry or first “prong” of the Strict Scrutiny test.

To satisfy this “prong” the government (or statutorily covered private institution) must be able to justify

its use of race by showing that 1) its purpose or interest in taking race into account is not based on racial animus or prejudice but serves a legitimate and highly substantial objective and 2) race-conscious decisions are necessary either to accomplish or safeguard the compelling interest.

Examples of interests that have been held to be “compelling” are: the government’s (or covered private party’s) interest in remedying the present effects of its own past discrimination;¹⁰ the government’s interest in national security;¹¹ and the government’s (or covered private party’s) interest in obtaining the educational benefits that flow from a diverse student body.¹²

AAAS and NACME note that in the particular context of science and engineering education, this country’s under-utilization of its African American, Hispanic American and Native American human resources is a compelling problem of critical proportion that will, if ignored, seriously impinge the national and economic security interests of this country.¹³ In this new era where some economies, such as Taiwan, Korea, and Ireland, have successfully enticed their citizens to return after advanced training and research experience in the U.S.,¹⁴ and where it appears that the number of new foreign graduate students enrolling in science and engineering programs in U.S. graduate schools is declining possibly because of Visa difficulties due to post-9/11 terrorism concerns,¹⁵ America’s institutions of higher education can hardly afford to ignore this problem.

Grutter expands the student body diversity rationale by recognizing an educational institution’s right, based on an implied First Amendment right to academic freedom, to establish its own mission and to embrace in its mission both educating its students *and* serving the nation’s need for well-prepared citizens, leaders, and “national and economic security.” Based on colleges’ and universities’ unique role in our democracy, society and economy, and in deference to such institutions’ academic judgment, student body diversity is a compelling interest that justifies narrowly tailored race conscious policies. Student body diversity both allows an institution to best educate all of its students and to serve the nation by contributing to a diverse pool of highly qualified STEM academics, professionals and workers.

To maximize and fully exploit the Supreme Court’s

opinion in *Grutter*, it is critical that institutions articulate their missions to embrace broad student diversity¹⁶ as a means of both educating their students and serving the nation. In the particular context of STEM education, a carefully crafted argument supporting not only the educational benefits of student body diversity, but also the national and economic security benefits of such diversity might even be more compelling. Policymakers should consult their institution’s general counsel’s office to discuss the kind of evidence that must be compiled to strengthen this rationale in the particular context of STEM education.

Narrow Tailoring

Second inquiry or “prong” of the Strict Scrutiny test.

To satisfy this “prong” the government (or covered private party) must look at the means it chooses to accomplish its “compelling” purpose and prove that the means are designed or framed as narrowly as is possible in order to achieve the objective. There are four key narrow tailoring questions:

- A. **Necessity.** Is it *necessary* to consider race in the program? Has the program considered or tried “workable” race-neutral alternatives? In sum, race may be used only to the extent necessary. This means that if it is possible to achieve the compelling purpose with a lesser use of race (i.e., using race as one of many considerations but not as an exclusive criterion), then the lesser use of race should be pursued.
- B. **Flexibility.** Is race considered in a flexible manner? Is it only one factor of many, or is it the predominant factor or the only factor considered?¹⁷
- C. **Burden.** What is the impact of the race-conscious program on non-minorities who will not “benefit” from the consideration of race? (Note that if all applicants are considered under the same broadly defined diversity criteria, including race, then non-minorities have not been unduly burdened by race being one of several criteria).
- D. **Assessment.** Does the program include a built-in mechanism for periodic assessment and refinement? Will the consideration of race and the availability of “workable” race neutral alternatives be regularly reviewed to determine if the use of race is still necessary so that the use of race is time-limited to the period of need?

► *Example of a narrowly tailored solution:* a flexible admissions program that considers each applicant individually, considers all aspects of the individual to assess his or her ability to succeed and to contribute to and benefit from studying at the school, and considers all applicants in relation to all of the many dimensions of diversity that are important for creating educational benefits (including racial, geographic, socio-economic and other diversity), and does not unduly burden non-minority applicants.

► *Example of a solution that is not narrowly designed:* a quota system or the automatic awarding of points on the basis of race.

Race-Neutral Alternatives

(defined separately because this is the “narrow tailoring” question that receives the most attention)

Policies or strategies that enhance diversity (including racial and ethnic diversity) without explicitly depending upon racial considerations. The approaches are allegedly neutral as to race, and therefore would not be subject to strict scrutiny.

► *Examples of Race-Neutral Alternatives:* The Texas 10% Plan, the One Florida/Talented 20% Program, and the California 4% Plan;¹⁸ socio-economic considerations in lieu of race; targeted recruitment, outreach, and financial aid; Advanced Placement Initiatives; community colleges coordination.¹⁹

University program implementers must make a serious good-faith effort to consider whether any workable race-neutral alternative policies exist to achieve the educational benefits of student body diversity before they adopt race-conscious approaches. There is NO REQUIREMENT that the university must actually first try and fail at an alternative if it is obviously unworkable.²⁰

Critical Mass

The Supreme Court in the *Grutter* case spoke approvingly of the law school’s compelling interest in enrolling a “critical mass” of minority students to achieve the educational benefits of student body diversity. However, there is no exact definition of critical mass. We do know that it is *not* a quota. Generally, it is the representation of students from an underrepresented group that a university deems sufficient to realize the educational benefits of a diverse campus

community for all students. This can include consideration of the representation of students necessary in living, working and classroom situations that allows each student to contribute as an individual and to not feel isolated or intimidated or that s/he must speak for an entire class of under-represented students. A “critical mass” cannot be fixed in terms of a set number, range of numbers or percentage of under-represented minority students. Having a “critical mass” will ensure that students from underrepresented groups do not feel isolated or like spokespersons for their race or gender, and do not feel uncomfortable discussing issues freely based on their personal experiences.

A critical consideration for STEM education is to recognize that science and engineering are creative and collaborative fields and that the world is increasingly diverse. In order for students, scientists and engineers to identify a diverse society’s needs and to devise culturally appropriate and effective solutions to meet those needs, they must be able to work productively with people of diverse races and backgrounds. Educational experiences that contribute to these skills occur in many settings, in the classroom or laboratory, in living and working situations. Critical mass is not capable of exact definition and may differ from school to school and field to field and over time. STEM departments vary widely in terms of their diversity, and diversity advancements in a Biology Department at University X will have little or no impact on the isolation that an underrepresented minority student may suffer in the Department of Mechanical Engineering at the same school.

2. Intermediate Scrutiny

Gender-conscious decisions made by government, public institutions or covered private parties, have generally been subject to intermediate scrutiny. Although recent Supreme Court cases have not tested the continued efficacy of this standard, the intermediate scrutiny analysis is somewhat less stringent than the strict scrutiny analysis triggered by race-conscious decisionmaking. The government must show that the law is necessary to achieve an important governmental interest, and that the law is narrowly tailored to that interest. The analysis is similar to the strict scrutiny analysis above but somewhat less stringent.

Three Key Lessons Learned from *Grutter & Gratz*

- ▶ The Supreme Court issued clear, strong, unequivocal language endorsing Justice Powell's opinion in *Bakke*, holding that the promotion of student body diversity is a compelling interest when necessary to achieve a school's educational mission, and can justify the use of race as a "plus" factor in a competitive admissions process where all applicants are "on the same footing" for consideration.
- ▶ A program implementing a flexible, holistic, individualized consideration of each applicant where race is only one of several relevant factors considered is likely to satisfy the "narrowly tailored" definition, whereas a program implementing a rigid, numerical value to each applicant based, even only in part, on race is less likely to be upheld and the automatic awarding of points based only on race is not permissible.
- ▶ A university has discretion, grounded in the First Amendment, in matters of academic judgment and does not have to exhaust every conceivable race-neutral alternative before considering race as one of many factors in order to satisfy the "narrowly tailored" definition, as long as the university engaged in a "serious, good faith consideration of workable race-neutral alternatives that will achieve the diversity." A university is not required to actually adopt those "alternatives" if the university deems them inappropriate or unworkable.

3. Weak Scrutiny (Rational Review)

Generally, if the government or a public institution is challenged about decisions that are based on classifications that do not involve race or gender, e.g., giving preference to athletes or legatees, they are required to show only a legitimate state interest (fielding a Division I football team or attracting more alumni donations) and that the law is rationally related to achieving that interest. Only a tiny percentage of laws are struck down when rational review is applied. Under this standard, a law must be arbitrary or capricious and lack any rational relationship to the legitimate ends sought to be achieved to be struck down. Some proponents of targeted recruitment and outreach programs have successfully argued that this is the proper level of review for such *inclusive* strategies to diversify a pool of applicants.

Significant Federal Legal Opinions

The following three legal opinions are instructive to a federal civil rights analysis.

1. *Grutter v. Bollinger*, 539 U.S. 306 (2003) & *Gratz v. Bollinger*, 539 U.S. 244 (2003).

In *Grutter v. Bollinger*, the U.S. Supreme Court held that broadly defined student body diversity is a compelling interest that can justify the use of race in university admissions when the institution determines that such diversity is necessary to achieve its educational mission. Though *Grutter*, indeed, is a landmark case in equal opportunity law, it is important to remember that nothing in *Grutter* requires a university to undertake a race-conscious affirmative action program to increase the diversity of its student body. To the contrary, *Grutter* simply established that such programs are allowed, though not required, when they are necessary and satisfy narrow tailoring. In the absence of a steadfast commitment by the higher education community to the precept of diversity and equal opportunity, *Grutter* will be rendered meaningless.

In *Grutter*, the Court restated its past holdings that all government uses of race are subject to "strict scrutiny," but also stated that a "strict scrutiny" analysis does not invalidate all uses of race. Justice O'Connor wrote that "*context matters*" when reviewing programs that take race into account.²¹ In its consideration of "context," the Court rejected the assertion that "the only governmental use of race that can survive strict scrutiny is remedying past discrimination." *Grutter*, 529 U.S. at 328. *Grutter* over-ruled *Hopwood v. Texas*, 78 F.3d 932 (5th Cir. 1996), which had held that the educational benefits of student body diversity were not adequate to justify the use of race in admissions and that only remediation of the present effects of an institution's own past discrimination could justify such use of race. *Hopwood* is no longer good law. The *Grutter* Court also noted, contextually, that numerous *amicus* briefs²² had been filed in support of the University of Michigan by scores of professional associations; universities, colleges, law schools and national educational organizations; retired military leaders; Fortune 500 corporations; more than 14,000 law school students, as well as additional groups and individuals.

Ultimately, the Court deferred to the University of

It's Not Just About Admissions! Post *Grutter* Suggestions for Targeted Programs

- ▶ Avoid race exclusive eligibility requirements for any benefit unless there is strong evidence exclusivity is necessary to achieve diversity or unless the decision to award the benefit does not consider race at all and race exclusive resources merely increase the pool of benefits for all students (e.g., financial aid where need for and amount of aid are determined without regard to race, and race exclusive, fungible dollars are later matched with qualifying individuals who are minorities, freeing other fungible dollars for qualifying students who are non-minorities). Similarly, avoid separate selection tracks. Review OCR's minority scholarship guidance cited, *supra*, in note 14.
- ▶ Ensure flexible, individualized consideration of many attributes of each applicant to any program so that race is only one of several factors being considered.
- ▶ Be careful of explicit numerical benchmarks that may be interpreted as quotas.
- ▶ Research. Research. Research. While you don't need to actually adopt every race-neutral alternative approach to race conscious approaches to diversity when some or all of these alternatives are not workable, you do need to engage in a serious, good faith consideration of whether such alternatives would be workable without changing the character of your institution or foreclosing your academic judgment. Leave a paper trail of this examination.
- ▶ Consider burden! Leave a paper trail on your investigation into the burden your program has on non-minorities. The good news is that in other contexts, the burden may be substantially less than in the admissions context. Remember that if you engage in a holistic assessment of every applicant under all selection criteria (including many different diversity criteria), *Grutter* holds that nonminorities are not burdened by race as a diversity criterion.
- ▶ Evaluate. Evaluate. Evaluate. Carefully investigate the need for the program, and include a projection of a possible ending point. In most STEM fields the need is so critical that the political controversy over your efforts is greatly reduced, thus similarly reducing the threat of serious litigation.

For extremely helpful post-*Michigan* guidance that goes beyond just admissions, refer your university counsel to the College Board publication, Coleman, Arthur and Scott Palmer DIVERSITY IN HIGHER EDUCATION: A Strategic Planning & Policy Manual Regarding Federal Law in Admissions, Financial Aid, and Outreach, available at http://www.collegeboard.com/prod_downloads/highered/ad/diversity_manual_2_ed.pdf

Michigan's good faith educational judgment that diversity is essential to its institutional mission, and that it is, therefore, a compelling state interest. The Court went on to find that the Law School's admissions process is also narrowly tailored to achieve the educational benefits of diversity because of the individualized, whole-file review that is used in which all aspects of an applicant are considered and race is one of the many factors, is considered flexibly and is not given the same weight at all times or for all applicants of a particular race. The Court also held that the Law School's goal of attaining a "critical mass" of underrepresented minority students does not transform its program into a quota.

Notwithstanding the *Grutter* holding, in *Gratz v. Bollinger*, the Court held that the University of Michigan's undergraduate admissions policy of automatically distributing twenty points to students from underrepresented minority groups was not narrowly tailored because it assumes that each member of a racial minority group makes the same contribution to

the university based solely on race and forecloses the exercise of academic judgment on the potential contributions of an applicant based on all of his or her attributes. Therefore, the undergraduate admissions policy, unlike the law school admissions policy in *Grutter*, could not be upheld under the second prong of the strict scrutiny analysis.

For another clear and concise set of recommendations for post-*Grutter* compliance, review and refer your university counsel to "Recommendations: Seven Secrets to Successful Compliance With *Grutter*," on page 43 of a recent report issued by the Mexican American Legal Defense and Education Fund, Americans for a Fair Chance, the Equal Justice Society, and the Society of American Law Teachers.²³

2. *Regents of the University of California v. Bakke*, 438 U.S. 265 (1978)

Over the past 25 years, Justice Powell's Supreme Court *Bakke* opinion has essentially served as the higher education community's foundation for justifi-

fying its use of race in university admissions when consideration of race is necessary to achieve the student body diversity that generates the educational benefits that achieve the university’s mission and when the approach to consideration of race is “narrowly tailored.” Justice Powell’s opinion also held that it is the educational benefits of student body diversity and not remediation of general societal discrimination that is a compelling interest justifying the use of race as one of many factors considered in admissions. As a legal matter, however, the opinion of the Court was complicated and splintered, as there were actually six different opinions in *Bakke*. On the issue of the state university’s use of race in admissions, some of the *Bakke* Justices would have held that when the government takes race into account not to demean or insult any racial groups, but to remedy past societal racial prejudice, the use of race is permissible. Other Justices would have resolved the debate without determining whether the program at issue was unconstitutional, instead finding it unlawful based on Title VI, the federal civil rights statute. Justice Powell’s opinion, however, was the controlling opinion of the Court on this issue because his opinion supported the admissions program’s use of race on the *narrowest ground*. Still, because of these six complicated opinions, after *Bakke*, lower federal courts and legal commentators engaged in a 25-year protracted debate over the precedential value of Justice Powell’s opinion, and whether its “diversity rationale” really could form a proper legal foundation justifying the use of race in university admissions

Three Key Lessons Learned from *Adarand*

- ▶ Federal affirmative action programs that use race as a basis for decisionmaking would be subjected to a “strict scrutiny” standard of legal review, just like state and local affirmative action programs. Previous Supreme Court cases prescribing a more lenient standard of review for federal programs were overruled.
- ▶ Strict scrutiny is not “fatal in fact.” Seven of the nine Justices recognized that federal affirmative action programs that use race as a basis for decisionmaking can be sustained under certain circumstances.
- ▶ *Adarand* did not determine the constitutionality of any particular federal affirmative action program, including the DOT program at issue in that case. The opinion said very little about the details of application of the strict scrutiny test. Therefore, the Department of Justice opined that *Adarand* made it necessary to evaluate all federal programs that use race or ethnicity as a basis for decisionmaking to determine if they comport with strict scrutiny.

policies. Some lower courts opined that *Bakke* permitted universities seeking a diverse student body to consider race as one of many factors in an admissions policy, other lower courts disagreed.²⁵

Grutter and *Gratz* indisputably ended this legal debate. The majority opinion in *Grutter*, adopted Justice Powell’s opinion in *Bakke* and even expanded it to recognize that a college or university has discretion, based on its First Amendment right to academic

Three Key Lessons Learned from *Bakke*

- ▶ Though a majority of the Justices ruled that the medical school’s affirmative action program would be struck down, Justice Powell’s opinion, along with the partially concurring opinions of Justices Brennan, White, Marshall and Blackmun, recognized that the government may take race into account, even if its use of race may be subjected to “strict scrutiny.”
- ▶ Justice Powell found that that the educational benefits of student body diversity were a compelling governmental interest justifying the use of race as one among many “plus factors” in admissions.
- ▶ Justice Powell’s opinion was adopted, and its diversity rationale was even expanded somewhat by the Supreme Court in *Grutter*. *Grutter* holds that the compelling interest in the educational benefits of student body diversity may encompass educating all of a school’s students and serving the nation’s need for a diverse pipeline of citizens, professionals, and workers. Legal debates over whether Justice Powell’s decision was legally binding are now irrelevant., and the holding of the federal appeals court in *Hopwood v. Texas*, 78 F.3d 932 (5th Cir. 1996) that the educational benefits of student body diversity are not compelling enough to justify taking race into account in college admissions has been over-ruled and is not good law.

judgment, to define its educational mission to encompass both educating its students and serving the nation and to determine that it has a compelling interest in the educational benefits of student body diversity to achieve that broadly defined mission. The crux of Justice Powell's opinion was that the use of race should be subject to "strict scrutiny," even in the context of an affirmative action program. This means that: (1) there should be a *compelling governmental interest* in using race; and (2) *the program must be necessary—and narrowly tailored to achieve—that interest*. Powell found that the educational benefits of diversity were a compelling governmental interest justifying the use of race as one of many "plus factors" in admissions. Powell said that race can be considered as one of many factors and can influence admissions decisions when the university is trying to achieve broadly defined diversity.

3. *Adarand Constructors, Inc. v. Peña*, 515 U.S. 200 (1995)

Adarand Constructors, Inc. v. Peña, 515 U.S. 200 (1995) stands for the fact that federal affirmative action efforts that utilize race or ethnicity as a basis for decisionmaking are subject to a strict scrutiny standard of review. Before *Adarand*, the Supreme Court engaged in a more lenient review of congressionally determined federal affirmative action programs, holding them only to the less stringent "intermediate scrutiny" standard of review, which resulted in sustainability of most federal efforts. Six years earlier, in *City of Richmond v. J.A. Croson Co.*, 488 U.S. 469 (1989), the Court had already applied "strict scrutiny" to state and local affirmative action programs. *Adarand* simply stands for the proposition that federal programs are no different.

Though *Adarand* received a great deal of publicity upon its announcement as a landmark affirmative action case, it left many questions undecided, most

The *Adarand* "Victory"

Both proponents and opponents of affirmative action policies often overlook the fact that in *Adarand*, the affirmative action program under attack was ultimately upheld, surviving a strict scrutiny analysis by the United States Court of Appeals for the 10th Circuit. Advocates of race-conscious programs should take heed of this lesser known but heartening *Adarand* story as a valuable lesson that persistence, ingenuity and creativity can win the day for affirmative action programs in the end.

Adarand is most often cited for the proposition that "strict scrutiny" applies to federal affirmative action programs much in the same way as it applies to such state and local programs. Essentially, the oft-cited 1995 *Adarand* case has come to symbolize a well-known shift in Supreme Court affirmative action jurisprudence, where an increasingly conservative Court significantly increased the legal obstacles that federal affirmative action programs would have to overcome in order to survive. The Supreme Court, however, did not preclude the federal government from undertaking the affirmative action program at issue; it merely required that the program survive a strict scrutiny analysis if it were to continue.

After the 1995 opinion, the case was sent back to the lower courts. With the Court's new standard in mind, Congress and the Department of Transportation shored up the government's compelling interest argument and creatively revised the program in an effort to help it survive a "narrowly tailored" analysis.

In reauthorizing the program, Congress was careful to demonstrate that the federal government had a "compelling governmental interest" in remedying the effects of past racial discrimination and opening up federal contracting opportunities to members of previously excluded minority groups." Congress did this by presenting very specific evidence through numerous Congressional hearings and Congressional investigations, as well as by compiling voluminous outside studies of statistical and anecdotal evidence. Similarly, the federal government revised the details of the program building in requirements that federal contractors attempt to meet goals in a race-neutral manner before adopting race-conscious measures, that incorporate time limits and checks and regular reassessments of the minority firms participating in the program, and among other things that incorporate additional flexibility including the ability for federal government contractors to seek waivers from participating.

In September 2000, the 10th Circuit court of Appeals ruled that the newly designed program did, in fact, survive strict scrutiny. The United States Supreme Court, when presented with the opportunity to opine further on the *Adarand* controversy, declined to take action, letting the 10th Circuit opinion in *Adarand* stand.

glaringly the constitutionality of the Department of Transportation affirmative action program at issue in the case.²⁶ In her majority opinion, Justice O'Connor said little about the details of how strict scrutiny—specifically the compelling interest and narrowly tailored tests—would be applied in the federal context. Legal analysts, therefore, have assumed that the empirical proof and other evidentiary standards that apply in the state and local context are the same for the federal government.

The other major outcomes of the *Adarand* case were policy-oriented, rather than legal, including the Clinton Administration's post-*Adarand* Memorandum to General Counsels from Walter Dellinger, Assistant Attorney General, dated June 28, 1995. The Memorandum set forth preliminary legal guidance on the implications of the Supreme Court's decision in *Adarand*,²⁷ calling for a complete evaluation of all federal programs that use race or ethnicity as a basis for decisionmaking to determine if they comport with strict scrutiny. Another example is the final Review of Federal Affirmative Action Programs, dated July 19, 1995, by George Stephanopoulos, Senior Adviser to the President for Policy and Strategy and Christopher Edley, Jr., Special Counsel to the President,²⁸ noting that the Administration would continue to support lawful affirmative action measures that are flexible, realistic, subject to reevaluation, and fair.²⁹

These documents are the last pieces of government-wide official advice issued by any Administration on the subject of affirmative action in federal programs.

State-Based Equal Opportunity Standards

► CALIFORNIA

Proposition 209

The state shall not discriminate against, or grant preferential treatment to, any individual or group on the basis of race, sex, color, ethnicity, or national origin in the operation of public employment, public education, or public contracting.

Federal Loophole

Proposition 209 contains an exception for federal programs. Nothing in this section shall be interpreted as prohibiting action which must be taken to establish or maintain eligibility for any federal program, where ineligibility would result in a loss of federal funds to the state.

California Percentage Plan

Admissions plan known as Eligibility in Local Context (ELC), guaranteeing University of California system admission to the top 4% of California's public and private high school graduates.

► WASHINGTON

I-200

The state shall not discriminate against, or grant preferential treatment to, any individual or group on the basis of race, sex, color, ethnicity, or national origin in the operation of public employment, public education, or public contracting.

Federal Loophole

I-200 contains a federal programs exception identical to that in Prop. 209. This section does not prohibit action that must be taken to establish or maintain eligibility for any federal program, if ineligibility would result in a loss of federal funds to the state.

Abandonment possible?

Earlier this year, a bill enjoying widespread bipartisan support was introduced in both houses of the Washington State legislature. The bill (S. 6268 and H. 2700) would allow the state universities to consider diversity consistent with the U.S. Supreme Court rulings in *Grutter* and *Gratz*. The bill would amend I-200.

► FLORIDA

Executive Order 99-281 (“the One Florida Initiative” & Talented 20 plan)

Directed the governor and his executive agencies to dispense with certain practices regarding the use of racial or gender set-asides, preferences or quotas in government employment, contracting and education.

The initiative includes the Talented 20 plan that guarantees state university admission to high school seniors graduating in the top 20% of their respective classes.

► TEXAS

No state law prohibitions Texas 10% Plan

As of this printing, there are no Texas laws prohibiting the state from considering race as a factor in university admissions. Before *Grutter* and *Gratz* were decided, Texas was so prohibited based on the 5th Circuit’s 1996 opinion in *Hopwood v. Texas*, 78 F.3d 932 (5th Cir. 1996). *Hopwood* has been *overruled* and is *no longer good law*.³⁰

In 1997, as a response to constraints on its ability to consider race as an admissions factor to state universities under *Hopwood*, the Texas legislature passed H.B. 588, commonly known as the Texas 10% Plan. The plan guarantees admission to any student graduating in the top 10% of their high school class to the public college or university of their choice.³¹

► MICHIGAN

Ballot Initiative

The Michigan Civil Rights Initiative is a coalition of individuals and organizations seeking to commence an anti-affirmative action ballot measure in the State of Michigan that would supercede the *Grutter* and *Gratz* cases on state law grounds and prohibit affirmative action efforts in hiring, public contracting and education. The Executive Director of the initiative is Jennifer Gratz, the plaintiff from the University of Michigan undergraduate case, and such individuals as Ward Connerly and Barbara *Grutter*, the other Michigan plaintiff, are active participants.

As of the printing of this document, the campaign for the 2004 ballot has been halted. Coalition members are reportedly setting their sights on another bout for the 2006 election year.³²

► OTHER STATES

As of this printing no other State has passed a law, constitutional amendment, or implemented an executive order impacting affirmative action at the state level.³³

Colorado had been considering the so-called “Colorado Civil Rights Act,” which sought to ban affirmative action in hiring, public contracting, and admissions to public universities, but the legislation was defeated on March 26, 2004.³⁴

Federal Paradigms—Ongoing Efforts To Encourage Equal Opportunity

In the final section of this primer we summarize ongoing federal affirmative efforts to broaden participation in STEM fields. It is critical that STEM program implementers understand that avenues to increase diversity in these fields still exist, and that these programs can continue as long as they are designed and implemented in a constitutionally permissible manner. The *potential* for new paradigms remains, though such new approaches will necessarily have to employ creative and innovative strategies compliant with the legal principles set forth above. AAAS and NACME maintain that inroads to solving the intractable problem of underrepresentation in STEM fields will only be made by institutionalizing or “mainstreaming” concern for these issues. We therefore encourage more widespread utilization of the broad language contained in the Science and Engineering Equal Opportunities Act, increased federal enforcement of Title VI, Title IX and 504 compliance in STEM fields, and the development of new models like NSF’s “Criterion II” (explained below) by institutions that fund STEM education and human resource development, including federal agencies, private corporations and foundations.

The Science and Engineering Equal Opportunities Act of 1980, 42 U.S.C. §1885, et seq.

(as amended, December 2002) (the “SEEOA”)

This often-overlooked law was the first of its kind with its mission to create equal opportunity in STEM fields. The SEEOA includes strong and broad language about the United States’ interest in promoting the *full use* of human resources in STEM fields that could be relied upon more broadly by proponents of equal opportunity programs in STEM fields. It is important to note that the Congressional findings and statement of policy set forth in the SEEOA is broadly applicable to STEM fields, even though the specific authorization language in the statute refers to the National Science Foundation. NSF relies upon this mandate to authorize its comprehensive science and

engineering education program to increase the participation of underrepresented groups in STEM fields, and to support activities to initiate research at minority-serving institutions. *The SEEOA remains in effect today.* It was amended as recently as one and a half years ago as part of the NSF Authorization Act, P.L. 107-368 where Congress specifically added “persons with disabilities” to its “Congressional statement of findings and declaration of policy” set forth in §1885 of the SEEOA, and also explicitly listed implementing the goals of the SEEOA as a priority area for NSF. The *Grutter* and *Gratz* cases should inform the implementation of the mandates of the SEEOA by universities and other institutions engaging in STEM human resource development, whether or not those institutions receive NSF funding.

The SEEOA

- ▶ The Congress finds that it is in the national interest to promote the full use of human resources in science and engineering and to insure the full development and use of the scientific and engineering talents and skills of men and women, equally, of all ethnic, racial, and economic backgrounds, including persons with disabilities.
- ▶ The Congress declares it is the policy of the United States to encourage men and women, equally, of all ethnic, racial, and economic backgrounds, including persons with disabilities, to acquire skills in science, engineering, and mathematics, to have equal opportunity in education, training, and employment in scientific and engineering fields, and thereby to promote scientific and engineering literacy and the full use of the human resources of the Nation in science and engineering. To this end, the Congress declares that the highest quality science and engineering over the long-term requires substantial support, from currently available research and educational funds, for increased participation in science and engineering by women, minorities, and persons with disabilities. The Congress further declares that the impact on women, minorities, and persons with disabilities which is produced by advances in science and engineering must be included as essential factors in national and international science, engineering, and economic policies.

NSF Criterion II

NSF Criterion II is another model for success. Since 1997, proposals submitted to the National Science Foundation have been evaluated through use of two merit review criteria. The first review criterion relates to the intellectual merit of the proposal, the second relates to the broader impacts of the proposed activity. Historically, most proposers have had more difficulty responding to criterion II than criterion I. Accordingly, as of October 1, 2002, NSF implemented a policy of returning, without review, proposals that do not separately address both merit review criteria within the Project Summary. NSF implemented this change to more clearly articulate the importance of broader impacts to NSF-funded projects.³⁵ NSF implements this policy in an even-handed manner that treats all proposers identically. AAAS and NACME maintain that use of a “Criterion II like” factor by more federal agencies and other institutions funding the STEM enterprise, will lead to collapsing the distinction between research and education, compelling universities and research institutions to examine the impact of their activities on the human resource development needs of the STEM enterprise, and consequently on the economic and national security interests of the nation.

NSF Broader Impacts

The components of the broader impacts criterion as defined by the National Science Board are as follows:

- ▶ How well does the activity advance discovery and understanding while promoting teaching, training and learning?
- ▶ How well does the proposed activity broaden the participation of underrepresented groups (e.g., gender, ethnicity, disability, geographic, etc.)?
- ▶ To what extent will it enhance the infrastructure for research and education, such as facilities, instrumentation, networks and partnerships?
- ▶ Will the results be disseminated broadly to enhance scientific and technological understanding?
- ▶ What may be the benefits of the proposed activity to society?

Equal Employment Opportunity Standards Imposed On Federal Contractors

It is essential that program implementers and their university counsel remember that federal equal employment opportunity standards remain in place. For decades, the federal government has not only banned discrimination by its contractors and subcontractors, but has also required both to take affirmative action steps to ensure that all persons have an equal opportunity for employment, without regard to race, color, religion, sex, national origin, disability or status as a Vietnam era or special disabled veteran. Most all universities are, of course, federal contractors. Therefore, university-wide plans to take steps to ensure equal employment opportunity for all—faculty, administrators, and students—is not only still allowed post-*Grutter*, but it is *required*.

The laws setting forth the federal standards in this regard are: Executive Order 11246, as amended; Section 503 of the Rehabilitation Act of 1973, as amended and the affirmative action provisions of (Section 4212) of the Vietnam Era Veterans’ Readjustment Assistance Act, as amended.

Under E.O. 11246, government contractors with 50 or more employees must include a standard “equal opportunity clause” in each of their contracts exceeding \$50,000. If a contractor is found to have violated E.O. 11246, he may be debarred from future government contracts. Additionally, each of these contractors must develop an Affirmative Action Plan that includes an analysis as to the utilization or underutilization of minorities and women. The actual selection decision, however, is made without regard to race. The Department of Labor (DOL) enforces these affirmative action laws. DOL also sets numerical goals for contractors to use, not as quotas, but to help to measure the effectiveness of affirmative action efforts to prevent discrimination. DOL also gives annual awards to contractors with outstanding affirmative action programs.

Just as in the case of Title VI, Title IX, and §504 compliance, AAAS and NACME strongly recommend increased and more effective monitoring of these equal employment opportunity requirements by the Department of Labor, as well as by STEM funding agencies, particularly as it relates to STEM faculty hiring and student employee assistants.

Modeling Ongoing Federal Programs

Excellent examples exist of federal programs that encourage institutions to broaden the participation of underrepresented groups by inclusive rather than exclusive approaches and by offering incentives for broad institutional reform, rather than by conferring specific benefits or burdens based on a person's status or membership in a particular group or class, e.g., race, gender, or age. NSF's Alliances for Graduate Education and the Professoriate (AGEP) program is a good example. It creates alliances, consisting of two or more doctoral degree granting institutions that agree to create institutional, departmental, and organizational culture changes that will result in significant increases in the recruitment, retention, degree conferral, and STEM career (especially academic) entry of minority students. Strategies are institutionally based, and the program is successful because it catalyzes institutional and departmental change, while operating in an inclusive, rather than exclusive, manner. Other examples of programs encouraging institutional transformation are NSF's ADVANCE program, which supports innovative approaches by institutions to increase the number of women entering and advancing within the professoriate, and NSF's Research in Disabilities Education program, which supports projects from a variety of institutions to develop broadly applicable methods and products for widespread use or commercialization for persons with disabilities in STEM education.

The National Aeronautics and Space Administration's (NASA's) ACCESS (Achieving Competence in Computing, Engineering, and Space Science) is an internship program for students with physical, learning, and other apparent and non-apparent disabilities. Students in STEM majors are placed in research-based positions at sites that provide assistive technology and other accommodations on the job. Successful internships can lead to coop opportunities, graduate study, and full employment. In this way, ACCESS, managed by the AAAS Project on Science, Technology and Disability, is inclusive, rather than exclusive. Similarly, the National Institute of General Medical Sciences (NIGMS) seeks to create programs to further the National Institute of Health's (NIH's) mission to address the complex problems associated with the disease disparity between

minority and nonminority populations in this country. In furthering this mission, NIGMS prudently operates its programs inclusively, supporting applicants who have demonstrated a strong potential to become outstanding contributors to biomedical research and who also have a commitment to remedy the problems of the biomedically underserved. NIGMS encourages applications from individuals who have experienced—and worked to overcome—educational or economic disadvantage, individuals from underrepresented groups, and individuals who have other personal or family circumstances that may complicate their transition to the next stage of their biomedical research career.

Outside of STEM fields, two other programs of note that are meticulously designed to broaden the participation of underrepresented groups within the bounds of constitutional principles are the Small Business Administration's (SBA's) 8(a) Business Development (BD) Program and the Department of Transportation's Disadvantaged Business Enterprise (DBE) program.

Federal agencies in STEM should consider modeling the BD program. The program is a business development program created to help small disadvantaged businesses compete in the American economy and access the federal procurement market. To participate in the program, an applicant must be a small business, must be unconditionally owned and controlled by one or more socially and economically disadvantaged individuals who are of good character and citizens of the United States, and must demonstrate potential for success.³⁶

Similarly, federal agencies providing financial assistance to universities in STEM fields should consider the DBE paradigm. The program continues a policy of helping small businesses owned and controlled by socially and economically disadvantaged individuals, including minorities and women, in participating in contracting opportunities created by DOT financial assistance programs. DOT DBE regulations require that all recipients of DOT financial assistance (namely, state and local transportation agencies) set specific goals, rather than quotas, for the participation of DBE firms in their DOT assisted contracts. DOT financial assistance recipients also have the responsibility of certifying the eligibility of DBE firms in these con-

tracts. In order for a firm to be certified as a DBE, it must be a small business owned and controlled by socially and economically disadvantaged individuals.³⁷

The Department of Transportation's DBE program was the subject of the litigation in *Adarand v. Peña*, 515 U.S. 200 (1995). Though previous iterations of the program might not have survived constitutional muster, the program in its current form is alive and well, and continues to be an agent for increasing opportunity for women and minority owned businesses in the transportation industry.

New approaches to broadening participation in STEM will necessarily have to employ creative strategies. These efforts will require collective thought and collaborative relationships among STEM program implementers free to share their ideas and past successes and failures. AAAS and NACME are committed to protecting and maintaining the kinds of open forums where these discussions and modeling activities can occur. The intimidation and fear used by conservative groups purportedly concerned about "equal opportunity" are unproductive and unfortunate tactics that are, in our estimation, threats to STEM human resource development and consequently to the future economic and national security of this country. The stakes are high. If those of us in the STEM education and research community truly believe that diversity is critical to our educational missions, we must commit to making this conviction a reality. Understanding the legal principles set forth in this primer is the first step to standing our ground.

ENDNOTES:

1. See *Grutter v. Bollinger*, 539 U.S. 306 (2003) and *Gratz v. Bollinger*, 539 U.S. 244 (2003).
2. See, e.g., "U.S. Is Losing Its Dominance in the Sciences," *The New York Times*, May 3, 2004, p.1 (discussing the lack of public awareness of this trend and its implications for jobs, industry, national security, and the vigor of the nation's intellectual and cultural life).
3. *Guardians Ass'n v. Civil Service Commission of the City of New York*, 463 U.S. 582 (1983); *Regents of the Univ. of California v. Bakke*, 438 U.S. 265 (1978).
4. See *Johnson v. Railway Express Agency*, 421 U.S. 454, 459 (1975); *United Steelworkers v. Weber*, 443 U.S. 192 (1979) and *Johnson v. Transportation Agency*, 480 U.S. 616 (1987).
5. In February 2003, the Commission on Opportunity in Athletics, an advisory board appointed by Department of Education Secretary Rod Paige, issued a report recommending that the Education Department change the way it implements and enforces Title IX policies (http://www.nacua.org/documents/TitleIX_Report_022703.pdf). Some argued that implementation of these recommendations would weaken Title IX. See *Minority View on the Report of the Commission on Opportunity in Athletics*, available at <http://www.savetitleix.com/minorityreport.pdf>. In July 2003, the Department issued a statement "clarifying" that it was committed to "continuing the progress that Title IX has brought toward true equality of opportunity for male and female student-athletes in America," and that no changes would be made to the current three-pronged test for measuring Title IX compliance in athletics. See <http://www.ncaa.org/news/2003/20030721/active/4015no2.html>
6. See Statement of Senator Ron Wyden, Chair of the Science, Technology and Space Subcommittee of the Commerce Committee of the United State Senate at the October 3, 2002 *Hearing on Title IX and Science*, available at http://commerce.senate.gov/hearings/testimony.cfm?id=836&wit_id=2283. See also Statement of Marcia Greenberger, Co-President, National Women's Law Center at the same Senate Subcommittee Hearing, available at http://commerce.senate.gov/hearings/testimony.cfm?id=836&wit_id=2290.
7. <http://www.gao.gov/new.items/do4639.pdf>
8. The Title IX regulations enforced by the Office for Civil Rights in the U.S. Department of Education at 34 C.F.R. §106.3 (b) explicitly permit colleges and universities to undertake voluntary affirmative efforts to increase the participation of women and girls in math and science programs: "in the absence of a finding of discrimination on the basis of sex in an education program or activity, a recipient may take affirmative action to overcome the effects of conditions which resulted in limited participation therein by persons of a particular sex."
9. Some call it "strict in scrutiny, fatal in fact," referring to the tiny percentage of laws that are upheld when strict scrutiny is applied; however, Justice O'Connor's opinion in *Grutter*, 539 U.S. 306, made it clear that it is possible for race-conscious decision-making by a governmental actor to survive a strict scrutiny analysis.
10. *U.S. v. Paradise*, 480 U.S. 149 (1987) (holding that a public safety agency had engaged in massive racial discrimination and was consistently recalcitrant in implementing orders not to discriminate and requiring a remedial remedy that was race-conscious: the agency had to promote one black state trooper for each white trooper elevated in rank as long as qualified black candidates were available).
11. *Korematsu v. United States*, 323 U.S. 214 (1944) (holding that pressing public necessity can sometimes justify restrictions based on race, and that the government's interest in protecting against espionage and sabotage to its national defense during World War II could justify a law excluding all Japanese Americans, whether disloyal or not, from the West Coast of the United States).
12. *Grutter v. Bollinger*, 539 U.S. 306 (2003).
13. See "America's Failure in Science Education" in *Business Week Online*, March 16, 2004 (arguing that the shortage of U.S. science and technology graduates threatens the U.S. economy, and that Washington's help is badly needed to tackle the problem); see also "Challengers to America's Science Crown" in *Business Week Online*, March 16, 2004 and "Gunning for the U.S. in Technology" in *Business Week Online*, March 16, 2004 (both articles arguing that countries from Israel to India are feeding their R&D capabilities with lavish resources so their economies can reap the resulting benefits, and that America's position as the undisputed leader in technology is under assault from countries worldwide). All articles available at http://www.businessweek.com/technology/tc_special/tc_04usdecline.htm

14. National Science Board, *The Science and Engineering Workforce: Realizing America's Potential*, NSB 03-69, Aug. 14, 2003, p. 12, available at <http://www.nsf.gov/sbe/srs/infbrief/nsfo4326/start.htm>
15. Black, Harvey "Foreign students drop in U.S. Graduate student enrollment in science, engineering peaks, but foreign students buck trend," *The Scientist*, June 30, 2004. See also Thurgood, Lori "Graduate Enrollment in Science and Engineering Fields Reaches New Peak; First-Time Enrollment of Foreign Students Declines," National Science Foundation Science Resources Statistics Info Brief available at <http://www.nsf.gov/sbe/srs/infbrief/nsfo4326/start.htm>
16. An institution that proffers as its compelling interest the "educational benefits of student diversity" and the service to the nation through the enrollment and education of a diverse student body must be careful to define diversity broadly. Diversity may include racial and ethnic diversity but should also include other types of diversity among its students, e.g., geographic, cultural, socio-economic status, special accomplishments and life experiences.
17. *Gratz* and *Grutter* hold in the admissions context that consideration of race must not receive the same weight in relation to every candidate who is a member of a particular race or at all times. Race may "tip the balance" in a particular case, but not in all cases involving minorities. Other factors also must receive significant weight in decisionmaking so that a non-minority with a particular talent or other diversity contribution is capable of "tipping the balance" in another case.
18. "Percentage plans" guarantee that students who graduate at the top of their high school classes will be admitted to state colleges and universities without the need to further compete for these limited spots. Racial diversity is enhanced using this "race-neutral" alternative only because a substantial percent of the high schools in these states are segregated by race, albeit on a *de facto* basis. On the futility of this approach, see Thomas J. Kane, "The Long Road to Race-Blindness," *Science*, vol. 302 (Oct. 24, 2003), and Appendix C.
19. While the Administration has not issued post-*Michigan* legal guidance for the university community, see note 19 *infra*, the Department of Education's Office for Civil Rights (OCR) recently released the second of two publications dealing with race-neutral alternatives. The publication, entitled "Achieving Diversity: Race-Neutral Alternatives in American Education," offers no legal advice, but is intended as a "toolbox" containing an array of race-neutral alternatives to foster "innovative thinking" about alternative ways to achieve diversity. See <http://www.ed.gov/about/offices/list/ocr/raceneutral.html>. Each institution must determine whether these alternatives are "workable" to achieve student body diversity in its setting. A number of race neutral alternatives (e.g., percentage plans and lotteries) are not workable in selective institutions that draw a student body from across the nation and world, and find holistic assessment of the many qualities of each individual to be essential for assembling student bodies that best serve their missions.
 Interestingly, the publication lists "recruitment and outreach and targeted financial aid" as "developmental approaches" designed to diversify student enrollments in a "race-neutral manner" by enriching the pipeline of applicants equipped to meet achievement standards. However, the Supreme Court has not addressed the validity of financial aid or scholarship programs designed to create a diverse student body. The only federal appeals court to address a similar issue *Podberesky v. Kirwan*, 38 F. 3d 147 (4th Cir. 1994), invalidated the racially exclusive Banneker scholarship and mentoring program at the University of Maryland, College Park that had been designed to remedy present effects of past discrimination that existed in the Maryland system. That court held that the university had not presented enough evidence of its own past discrimination, and that the program was not narrowly tailored. This case, however, did not address the issue of the validity of financial aid programs designed to create a diverse student body. Similarly, *Grutter* and *Gratz* are also not on point. While the equal protection principles and standards articulated in these cases would likely inform a decision in contexts beyond admissions, the context of an admissions analysis (including the benefits and burdens of using race) may be very different than in other contexts. Depending on the particularities, some financial aid targeting underrepresented minorities may not implicate equal protection or might survive a strict scrutiny analysis. OCR issued policy guidance to this effect in 1994. That guidance remains in effect today, and presents a comprehensive legal analysis on the applicability of Title VI's nondiscrimination requirement to financial aid that is awarded (at least in part) on the basis of race. See 59 Fed. Reg. 8756 (Feb. 23, 1994) available at <http://www.ed.gov/about/offices/list/ocr/docs/racefa.html>.
 Similarly, the Supreme Court has not addressed recruitment and outreach strategies to increase academic diversity, though several lower courts have addressed such strategies in contexts including broadcasting, law school admissions, housing and employment. Different statutes apply in some of these contexts and may dictate a different result. Recruitment and outreach programs can take many different forms, some of which may confer substantial, tangible benefits on participants. They can also occur at varying stages in the application process (including after the point when a decision is made regarding an applicant who has not yet finalized an acceptance). In most jurisdictions, depending on the particularities of the program, it is likely that the use of some of these strategies to increase racial and ethnic diversity would be upheld, and might not even be subjected to a strict scrutiny analysis. Programs that take race into account but are not exclusively for racial minorities are easier to sustain than race exclusive programs, but even some race exclusive outreach and financial aid may be upheld. Expert legal advice is necessary to assess the sustainability of particular programs and approaches. For an excellent legal analysis of the validity of financial aid, recruitment and outreach strategies, university counsels should consult "Preserving Diversity in Higher Education," Bingham McCutchen, Morrison & Foerster, and Heller Ehrman, et al. http://www.equaljusticesociety.org/compliancemanual/Preserving_Diversity_In_Higher_Education.pdf, pp. 75-99.
20. See also Design Principles in this document that present current research showing most of these so-called race-neutral alternatives to be ineffective.
21. *Grutter*, 539 U.S. at 327. STEM program implementers should consult with their university counsel about full exploitation of the concept of "context matters," particularly in light of the severe underrepresentation that exists in STEM fields and the critical importance of STEM to America's economic and national security. Arguments setting forth the heightened importance of diversity in STEM fields because of America's changing demographics, STEM's vital importance to U.S. economic growth, and U.S. businesses' dependence on university production of a diverse pool of scientists and engineers are eloquently set forth in the U.S. Supreme Court Brief of *Amici Curiae* Massachusetts Institute of Technology, Stanford University, DuPont, IBM, National Academy of Sciences, National Academies of Engineering, and National Action Council for Minorities in Engineering in *Grutter v. Bollinger* and *Gratz v. Bollinger*, pp. 9-20, available at http://supreme.lp.findlaw.com/supreme_court/briefs/02-241/02-241.mer.ami.mit.pdf.
22. See *Grutter*, 539 U.S. at 330-31. An *amicus* brief is a "friend of the Court" brief. It is filed by persons or organizations that are not part of the lawsuit before the Court, but feel that they have legal arguments they want to present to the Court anyway.
23. *Blend It Don't End It: Affirmative Action and the Texas Ten Percent Plan After Grutter and Gratz*, June 24, 2004, available at <http://www.maldef.org/pdf/PostGrutterReport.pdf>.
24. See, e.g., *Smith v. University of Washington Law School*, 233 F.3d 1188 (9th Cir. 2000).
25. See, e.g., *Texas v. Hopwood*, 78 F.3d 932 (5th Cir. 1996).
26. That program was later upheld after the case was sent back to the lower courts and reevaluated under the newly announced proper standard of strict scrutiny. See *Adarand cert. denied*.
27. Memorandum to General Counsels from Walter Dellinger, Assistant Attorney General, dated 6/28/1995, setting forth preliminary legal guidance on the implications of the Supreme Court's decision in *Adarand Constructors, Inc. v. Peña*, 63 U.S.L.W. 4523 (U.S. June 12, 1995), available at <http://clinton2.nara.gov/WH/EOP/OP/html/aa/adarand3.html>.
 Civil rights proponents have been highly critical of the Bush Administration for its failure to offer similar post-*Grutter* advice. See *The Bush Administration V. Affirmative Action: Justice Department Drags Feet On Upholding Ruling*, Citizens' Commission on Civil Rights, 12/2003, available at <http://www.cccr.org/AffirmativeActionReport.pdf>.
28. Review of Federal Affirmative Action Programs by George Stephanopoulos, Senior Adviser to the President for Policy and Strategy and Christopher Edley, Jr., Special Counsel to the President, available at <http://clinton4.nara.gov/textonly/WH/EOP/OP/html/aa/aa-lett.html>
29. See Appendix A of the Review of Federal Affirmative Action Programs for details, available at <http://clinton4.nara.gov/textonly/WH/EOP/OP/html/aa/ap-a.html>.
30. As of May 2004, the University of Texas reportedly announced a return to race-sensitive admissions to the extent allowed under *Grutter* and *Gratz*, while Texas A&M reportedly has no such plans but has undertaken targeted outreach efforts and scholarships. "Reality Check: Texas Top Ten Percent Plan" in *Hispanic Outlook*, May 3, 2004, pp. 23-25. See also note 22, *infra*.

31. Much has been written criticizing and supporting the efficacy of these so-called percentage plans. Each plan, however, is very different with its own intricacies and criteria. For a comprehensive comparative analysis of each plan, see Horn, Catherine L. and Stella M. Flores, *Percentage Plans in College Admissions: A Comparative Analysis of Three States' Experiences*, Report of the Harvard Civil Rights Project, February 2003, available at <http://www.civilrightsproject.harvard.edu/research/affirmativeaction/tristate.pdf>. The debate is most fluid in Texas where post-*Grutter* no laws prohibiting race-conscious policies exist. In late June 2004, affirmative action advocates issued a report to the Texas state legislature urging it to combine the 10% plan with race-conscious policies recognizing the benefits and limitations of the plan which at U.T. Austin has increased minority enrollment, but resulted in students under the plan taking up nearly 70% of its freshman class. *Blend It Don't End It: Affirmative Action and the Texas Ten Percent Plan After Grutter and Gratz*, issued by the Mexican American Legal Defense and Education Fund, Americans for a Fair Chance, the Equal Justice Society, and the Society of American Law Teachers, June 24, 2004, available at <http://www.maldef.org/pdf/PostGrutterReport.pdf>.
32. "UPDATE: Ward Connerly gives up on Michigan ballot initiative for 2004 election!" available at http://www.civilrights.org/issues/affirmative/michigan_update.html (citing the Associated Press and quoting the campaign as saying that it would consider another effort in 2006). See also "Anti-Affirmative Action Vote Halted," *Boston Globe/Associated Press*, May 28, 2004 (citing internal disorganization, discord, and the health problems of Ward Connerly as among the reasons for abandoning the effort).
33. Americans for a Fair Chance's January 2004 report, entitled "Anti-Affirmative Action Threats in the States: 1997-2003," chronicles anti-affirmative action efforts in every state in detail. It is available on their website at www.fairchance.org.
34. "Ward Connerly Defeated on Two Fronts," available at <http://www.civilrights.org/issues/affirmative/details.cfm?id=22050>. See also "Colorado Senate Defeats Affirmative Action Measure," available at http://fairchance.civilrights.org/research_center/details.cfm?id=22048.
35. See NSF Important Notice No. 127, dated July 8, 2002, available at <http://www.nsf.gov/pubs/2002/iin127/imptnot.pdf>.
36. Socially disadvantaged persons are individuals from the following groups: Black Americans, Hispanic Americans, Native Americans (American Indians, Eskimos, Aleuts, and Native Hawaiians), Asian Pacific Americans (persons with origins from Japan, China, the Philippines, Vietnam, Korea, Samoa, Guam, U.S. Trust Territory of the Pacific Islands [Republic of Palau], Commonwealth of the Northern Mariana Islands, Laos, Cambodia [Kampuchea], Taiwan; Burma, Thailand, Malaysia, Indonesia, Singapore, Brunei, Republic of the Marshall Islands, Federated States of Micronesia, Macao, Hong Kong, Fiji, Tonga, Kiribati, Tuvalu, or Nauru; Subcontinent Asian Americans (persons with origins from India, Pakistan, Bangladesh, Sri Lanka, Bhutan, the Maldives Islands or Nepal), and members of other groups designated by the SBA. SBA's regulations regarding this program are promulgated at 13 C.F.R. Part 124.
37. Department of Transportation regulations require its recipients of financial assistance to presume that citizens of the United States (or lawfully admitted permanent residents) who are women, Black Americans, Hispanic Americans, Native Americans, Asian-Pacific Americans, Subcontinent Asian Americans, or other minorities found to be disadvantaged by the SBA, are socially and economically disadvantaged individuals. DOT requires its funding recipients to require DBE applicants to submit a signed, notarized certification that each presumptively disadvantaged owner is, in fact, socially and economically disadvantaged.

Design Principles

There is no cookie-cutter approach to developing programs that serve the cause of diverse participation in STEM. One can look at the experiences of others, distill documented programs and processes, but in the end, each must be crafted and configured anew. Because of this need to create programs in context, we offer a set of design principles rather than recipes. Much of this may seem like “common sense.” Yet in addition to programs that are known by research and evaluation to have exhibited success,¹ we’ve utilized the discussion of the participants at the January 2004 conference—many of them diversity program architects—to array the design principles. They serve as a template for constructing programs and projects that will fit the needs, challenges, and context of the particular offering institution.

The design principles are grounded in the discussion contained in the Legal Primer, so that program managers may draw on legal precedent to bolster their efforts. Taken together, these principles represent strategies for coping on campus rather than back-pedaling from “what works” in response to allegations and criticisms that may be unfounded, distorted, or without legal precedent.² They are meant to encourage conversations between those who lead and administer programs that assist students and faculty, and institutional officials, especially university counsels, who may be inclined to modify or abandon those programs in the face of intimidation without examining their design or performance.

As a recent article on higher education lawyers put

it, “‘competent representation’ today means *preventive* advice.”³ Think about what your university counsel can do for you. To help, we offer an assortment of antidotes, templates, or checklists—take your pick—for assessing current practices that may be challenged on the grounds that their design is flawed or legally indefensible.

Finally, we should remain mindful that STEM fields represent pathways to 21st century careers, not only in the U.S. but world-wide. Preparing as many students who are both interested in, and of demonstrated capability to pursue such careers is an imperative, especially if viewed against a backdrop of heightened national security here and challenged economic vitality abroad. STEM can either be an equalizer through access—to information, networks, and other global resources—or a wedge that widens the gap between those with “knowledge” and those in perpetual “ignorance.” The opportunity to acquire and use STEM skills underpins a robust workforce and particularly emboldens its leaders in government, industry, education, and the media.

What’s different about STEM is that: (1) participation in science and engineering vis-à-vis other fields is a national priority and should be treated as such; and (2) the *under*participation of women, minorities, and persons with disabilities in STEM—regardless of employment sector—continues as a structural problem, almost 40 years of policy and practice notwithstanding.

The eight design principles presented below

encompass both theory *and* practice. They are offered as reinforcement for institutions of higher education committed to building STEM capacity as a human and technical resource to stand their ground.

1. Mission: How do diversity efforts fit into the larger institutional mission?

Theory: Student-oriented programs are usually created in response to an overarching concern—the competition for talent. STEM disciplines are prominent in this competition because they pride themselves on attracting the “best” talent, both high school graduates and baccalaureate recipients. But the appeal of STEM careers to U.S. students has eroded in the last generation. Cost combined with high attrition rates and protracted professional preparation (notably, serial postdoctoral appointments) has diminished the attractiveness of pursuing STEM degrees. The impacts of these factors are even more profound on the decisions of those who are disadvantaged, first-generation, students of color and/or women. Their history of participation in STEM has been limited not by choice alone. Increasing awareness of and academic preparation for STEM as an option has served as a fundamental rationale for “intervening” through campus programs to improve both precollege student competitiveness for admission as well as performance and knowledge/skills acquisition once enrolled. The problem is not only *how to attract more*, but assuring that those electing STEM are equipped with the tools to succeed. This is achieved in many ways, but they all begin with the campus “mission statement.” By articulating what the institution values, all of its members have a focus for their commitments and actions. The institution, in short, can be held accountable for what it promises to deliver.

Practice: Justice O’Connor’s opinion in *Grutter* explicitly reaffirms a university’s first amendment right to include in its mission statement a commitment to diversity. A recent survey by the National Association for College Admission Counseling found that of the 451 colleges and universities who responded, 74 percent included a commitment to diversity in their mission statements. Sixty-eight per-

Sample Mission Statements

Below are excerpts of actual university mission statements and one professional society mission statement, with the institutional identifications removed. These mission statements illustrate (1) an explicit racial and ethnic diversity commitment, (2) a commitment to diversity without mention of race and ethnicity, and (3) a more oblique reference to student development and society.

UNIVERSITY 1: “...The University counts among its greatest strengths and a major component of its excellence the diversity of its faculty, students, and staff. It is committed to equal educational opportunity. It strives to hire a diverse faculty and staff of exceptional achievement through affirmative action, to celebrate diversity in all of its programs and activities, and to recruit and retain qualified graduate and undergraduate minority students...”

UNIVERSITY 2: “The mission of [This Institution] is to advance knowledge and educate students in science, technology, and other areas of scholarship that will best serve the nation and the world in the 21st century... [This Institution] is dedicated to providing its students with an education that combines rigorous academic study and the excitement of discovery with the support and intellectual stimulation of a diverse campus community...”

UNIVERSITY 3: “The mission of [This Institution] is to expand human knowledge and benefit society through research integrated with education. We investigate the most challenging, fundamental problems in science and technology in a singularly collegial, interdisciplinary atmosphere, while educating outstanding students to become creative members of society.”

PROFESSIONAL ASSOCIATION: “The mission of [This Society] is to advance and diffuse the knowledge of [This Discipline]...[and] to sponsor programs designed to increase the number of women and minorities in [This Discipline]. In this way, [This Society] fosters the health of the profession through its career and development initiatives...”

cent clearly mention race and ethnicity as a component of that diversity, and 64 percent added other diversity categories (e.g., socio-economic, geographic, age, religion, gender, first-generation status, international, etc.).⁴ For any program manager, knowing your university’s or organization’s mission statement is the bedrock for designing programs that serve the mission.⁵

For universities that do not explicitly mention stu-

dent/faculty diversity as a major part of their mission statements, program managers may work, in consultation with their provost, dean, or president, to ensure that their efforts are a good fit for the institution. Language in mission statements that expresses a desire to “prepare students for a changing world,” discuss the “role of the university in the United States,” or that seek to “address national needs” or “compelling state interests,” may all be used in diversity program planning.

The bottom line, however, is that universities need to take on a strong leadership role that unambiguously states a commitment to diversity in their mission statements. In addition, all universities are legally required to have an affirmative action plan in place for faculty and staff hiring (see Legal Primer). All members of the university community should review both their institutions’ mission statements and the affirmative action plan, and promote the adoption of clearly worded commitments to diversity. University counsels should also be apprised of the importance of diversity to the institution so that their advice is in accordance with the university’s mission.

2. Intent of the program: How does the program address overall university or organizational goals? What need does the program meet? What evidence led to the creation of the program?

Theory: Program intent must be translated into program *design*. How to make operational an identified need associated with a particular population, indeed one that fulfills a larger institutional goal, cannot be left to chance. Surveying what has been done elsewhere, on your own or similar campuses (see Context), helps to benchmark what should be designed into the program. This also makes clear to all who would approve and participate what is expected of the effort, how effects can be attributed to the program, and what will be measured as primary outcomes (see Operations). Declaring the core service to be offered and identifying the principal mechanism for delivering the service are essential. Evidence of success with the population(s) targeted should be defined *a priori*.

Practice: After assessing the goals of the university or organization, potential programs should clearly state the program’s mission and objectives using the same terminology, but modified to reflect its specific intent. The need for the program should also be explicitly laid out, preferably grounded in data that supply clear evidence that something must be done if valued outcomes are to be realized. Data from both your own institution, as well as national-, state- and regional-level research, can help reinforce program rationales. Clearinghouse organizations such as the Commission on Professionals in Science and Technology (www.cpst.org) look across various federal, disciplinary, and professional society databases to update trends in enrollment, degrees, hiring, salaries, and other STEM market indicators of key outcomes. These data can put institutional performance as measured by local sources into national context, as NACME (www.nacme.org) does for engineering.⁶

In STEM fields, program intent is an extension of the institutional mission, while grounded in a perspective on underrepresentation that applies to a particular discipline. Therefore, in addition to the university’s mission statement, program developers may utilize information about the specific field in which they are targeting their intervention. Reinforcing the rationale for an intervention with information on local, state, regional or national needs (changing demographics, economic development, and/or security concerns, for example) “brings the problem home.” In general, the more evidence that can be presented, the more grounded—connected to larger needs and trends—the program becomes.

3. Target population: What is the population to be served? How is this population linked to the intent of the program?

Theory: Even if the intent of the program and its delivery mechanism are sound, how to reach the desired population is a multifaceted challenge. The Thomas Kane analysis (see Appendix C) shows, based on econometric modeling, that many of the suggested alternatives to racial targeting have been largely ineffective in either admitting more students of color to universities or increasing their participation in STEM

fields. Indeed, current evidence points to little or no impact of race neutral alternatives.⁷

Kane points out that the use of race in admissions decisions “demands a tradeoff among three worthwhile goals: race-blindness, academic selectivity, and a semblance of racial diversity on selective campuses.”⁸ The alternatives herald a continuing dilemma. For example, states that have embraced “percent plans”—California, Texas, and Florida—have large numbers of African American and Latino students attending segregated high schools. Similarly, college admissions schemes based on economic disadvantage “offer a very indirect means for achieving racial diversity.” Finally, the Supreme Court’s use of “critical mass” as a gauge of how much diversity is enough to produce the educational benefits universities seek—not for “minority students alone, but the whole class”—remains nebulous. Any *a priori* percentage becomes a “quota.”

Practice: The population your program is intended to serve will be a natural outgrowth of program intent. If, for example, your goal is to diversify enrollment in a STEM field, creating awareness demands outreach (see below), some of which can be done impersonally, e.g., through web sites, but much of which requires some personal contact and the opportunity to ask questions and consult other professionals. The program should specify how these connections will be made and facilitated. If the chief outcome is increased applications for participation in a precollege program, or college admission, or a summer internship, then those should be identified. This also helps to develop a network of professionals on campuses and in employing institutions that becomes attentive to both the problem and how the program is working to remedy it. Broadening the target population runs the dual risk of not serving those with the greatest need and diluting program impacts for those who are served. Resources can only be stretched so far.

While the legal interpretation of “narrow tailoring” makes the exclusive targeting of underrepresented minority groups harder to defend, that does not mean that targeting is forbidden (see Character below). The Supreme Court ruling states only that a good faith effort must be made by any program to consider race neutral alternatives. This does not mean that you

must necessarily adopt race-neutral targets to demonstrate that they are unworkable. You simply need to consider them as they may be obviously unworkable. This consideration should be well documented, along with the claim that race-conscious targeting is needed to meet diversity goals in a certain discipline, department, school, or institution.

The findings of the Texas Higher Education Opportunity Project, which examines the impacts of the Texas Top 10% Plan post-*Hopwood*, are instructive.⁹ With a rationale that grades are better predictors of college success than test scores, which in turn levels higher education opportunity, promotes access, and shifts the debate from “deserving vs. undeserving race/ethnic groups to deserving vs. undeserving schools,” Marta Tienda reports that the top 10% law benefits Asians the most and Blacks the least. In all, after three years, “nonminority excluded groups” in Texas enjoy broadened opportunity in higher education. She cautions that the limitations of so-called percent plans require massive outreach and retention investments for students from low-performing (read “segregated”) schools.¹⁰

The preponderance of such evidence cannot substitute for the generation of research on the population served by *your* program, in *your* state, and documentation of how you have considered race neutral alternatives. What, under narrow tailoring, are the potential impacts of your program on those groups omitted from the target population? If you are providing a benefit or service that is not available to those ineligible for your program, the impact of that ineligibility needs to be assessed and documented. A starting point for any program is to assess the services and benefits available to all students at your institution and examine who has not been benefiting from those services. If, for example, research assistantships have gone largely to men, instituting a program that opens up new slots for women does not harm the men who will continue to compete for the available slots. But to reserve slots for members of certain groups is a quota, and therefore indefensible. By documenting prior inequities and demonstrating the added benefit of both more slots and greater potential diversity, targeting specific groups becomes viable.

After such consideration, you might decide to incorporate a mechanism by which non-members of

Expanding the Target Population: One Program's Experiences

Following their legal counsel's review, the minority summer internship program at a research university opened up its target population in 1999 to include "low-to-moderate income" and "first generation college" students. The program had been in place since 1995, allowing for a pre-post comparison of the applicants to and participants in the program.

Changes in wording included deleting the word "minority" from the title of the program (from Minority Summer Internship Program to just Summer Internship Program). The program announcement modified language to include the new groups—in italics below:

"This summer internship program provides experience in research laboratories to *students of diverse backgrounds, including underrepresented minority students and students from economically disadvantaged and underserved backgrounds* that have completed two or more years of college."

The following table tracks applicant and participant statistics in the program from 1995 through 2003. The program manager points out that "Opening the program to these two additional categories of individuals [low-moderate income and first-generation college] did not dramatically impact our applicant/participant pool. Indeed, it increased the number of students served so that support of underrepresented minorities was undiluted. In the long run, of course, it is unclear how this one experience changed minority student outcomes in the aggregate."

Year	Total Students	African American	American Indian	Alaskan Native	Pacific Islander	Mexican Amer/Chicano	Puerto Rican	Other Hispanic	Non-URM
Participants									
1995	16	13	1	1	0	0	1	0	0
1996	17	17	0	0	0	0	0	0	0
1997	29	23	0	0	2	0	4	0	0
1998	31	16	4	0	1	2	2	3	3
1999	21	12	2	0	1	1	1	3	1
2000	21	8	1	0	1	1	4	1	5
2001	47	26	0	0	0	5	2	5	9
2002	45	30	3	0	0	4	0	3	5
2003	47	32	1	0	0	5	2	6	1
% of Participants		64.6	4.4	0.4	1.8	6.6	5.8	7.7	8.8
Applicants									
1995	56	49	1	0	0	0	2	1	2
1996	97	64	2	0	12	8	2	4	6
1997	110	77	1	0	6	6	13	0	6
1998	164	112	6	0	3	11	15	9	10
1999	140	69	3	0	3	11	11	11	32
2000	122	55	5	0	1	11	21	4	25
2001	149	89	2	0	0	8	15	10	25
2002	207	118	8	0	4	11	6	34	26
2003	212	93	9	0	3	21	12	31	43
% of Applicants		57.8	3.0	0.1	2.5	6.9	7.7	8.3	13.9

Source: anonymous research university

targeted groups can also compete if they meet certain criteria. Most programs that have broadened their selection criteria maintain wording that states that certain groups are eligible (e.g., African Americans, Hispanic Americans, and Native Americans), but also includes other categories of underrepresented groups (e.g., low income and first generation college students), or students with a demonstrated commitment to diversity goals.

It is incumbent on the program manager to pay attention to the impact that broadening the target populations has on the make up of program applicants and participants. Again, data matter. By maintaining detailed data on program recruitment, applications, enrollments and retention, program managers have a powerful tool with which to evaluate program targets and make modifications to best meet those targets.

4. Character of the program: What does the program do? Where is it located?

Theory: While there is no moratorium on targeting racial and ethnic minorities, there are still two principles to be followed no matter what the character of your intervention. The Supreme Court upheld the use of race in admissions only if it could be shown to further a “compelling state interest” and be “narrowly tailored” (see Legal Primer). The Supreme Court ruling in *Grutter* reaffirmed the *Bakke* ruling that there are two compelling state interests that can justify the use of race in admissions: remedying the present effects of past discrimination and creating a diverse student body. This acceptance of the use of race in admissions decisions supports, to some extent, the use of race and ethnicity in programs and interventions—from financial awards and scholarships to recruitment and retention programs to outreach and K-12 programming—if they represent a compelling state interest and are narrowly tailored.

Practice: Remedying the effects of past discrimination has proven extremely difficult to establish empirically. The evidence needed to demonstrate that current low numbers of minorities are due to past discrimination is almost impossible to assemble.¹² Therefore, most interventions will likely use the diversity rationale for designing specific programs. This rationale, however, also requires a level of evidence to justify using race in interventions beyond admissions practices. We have emphasized throughout this document the need to gather research and data to support mission statements, program intent, and target populations. The design and character of programs should also cite evidence that supports whatever is planned as a means of advancing campus diversity and must be narrowly tailored to accomplish that goal.

Narrow tailoring has several requirements, all of which are data- and research-based. First, any consideration of race in programming should not be mechanical, but flexible. In other words, race should be one factor among others used to determine eligibility for program activities, whether they are financial or other kinds of support activities. Second, there must be a good faith effort undertaken to ascertain if race-neutral alternatives could be implemented

instead in achieving diversity goals. Evidence should also be marshaled to show that the impact of program activities does not unduly burden non-minorities. Finally, narrow tailoring demands substantial ongoing review and evaluation to determine if a program’s activities to promote diversity are still necessary.¹³

The act of configuring programs to support diversity, then, must always take into account the requirements of compelling state interest and narrow tailoring. They must build in mechanisms that take race into account in a flexible way, and include “real time” mechanisms to evaluate the context within which the program operates and the outcomes of program activities. By doing so, they defend against anti-affirmative assaults, such as attacks on summer research programs, special scholarships, and outreach activities.

At the nuts-and-bolts level of program configuration and operation, program designers and managers should keep an eye on narrow tailoring requirements and build them directly into the program. Programs must have an identity, a leader, a staff, campus home, budget, and a constituency of participants. Wherever the program is housed (in a department, a college, or institution-wide), evidence should be gathered that supports program aims and creates buy-in at all levels. Program activities should be designed to address specific diversity needs, be justified with research into past and present practices, and take into account the positive and possible negative impacts on other students (minority and non-minority alike). Expected behavior on the part of the students served and the professionals who contribute their time and knowledge should be made explicit in program documents. Data, research, and reporting on promising practices should be incorporated so as to influence the character of the program and its operation on campus and perhaps elsewhere.

Narrow Tailoring Requirements:

- The use of race in program or institutional admissions must be **flexible**.
- There must be consideration of whether workable **race-neutral alternatives** exist, and whether program activities will unduly burden other groups.
- **Review and evaluation** of program activities and outcomes must be ongoing.

5. Program Context

Theory: Context matters. One size does not fit all. Any program to promote diversity in STEM fields is located in myriad contexts. It is first and foremost located in a particular institution that has a history that should be taken into account throughout the design and implementation of the program. At the institutional level, establishing context should involve collecting yearly data from throughout the institution, as well as in the STEM discipline(s) in which you are working.

Collecting baseline data and data over time will help shore up your rationale for locating your project at your institution, college, department, etc. These data are especially important for deciding on “critical mass”—the size of the community of students from different groups that is necessary for minority students to feel comfortable and, at the same time, that will attract a number of other students, through recruiting efforts. In the words of a student at a private research university who has greatly benefited from the chance to learn from and participate in ethnic student organizations, “these groups are among the most unifying, as they generate cross-ethnic support and force us to develop racially sensitive practices. That’s what education should be about: diverse people challenging each other to be more responsible to the community as a whole.”¹⁴

What constitutes a critical mass of students sustainable over extended periods through successful retention and recruitment is currently amorphous—and left intentionally so by the Supreme Court. Gathering good data may go a long way to establishing what that number, both the order of magnitude and the range of possibilities, might look like.

Practice: Instituting programs within an institutional context involves reviewing specific policies and practices at your institution that might impact the presence of underrepresented groups in STEM fields. If there are documented instances in which you are interested in designing interventions for groups that have historically not received services and benefits, this provides a well-grounded basis for adding them, without necessarily taking anything away from those who had benefited before. In addition, looking across your institution, you might find that other schools,

colleges or departments have adopted interventions that have had a measure of success in diversifying their talent pools. Basing your program on that success, while adapting it to your particular needs, grounds your intervention in the same context, and could produce institution-wide “best practices” that are flexible, or identification of “worst practices” that should be avoided. It might also serve to open up a dialog across your institution, developing a network of program administrators that could then join university or organization counsels to ensure that programs are well-designed and legally defensible.

Programs to diversify the talent pool in STEM disciplines are also located within the context(s) of those discipline(s). Data-collection should look across your discipline to ascertain the need for diversity in the field as a whole. For some fields this is more obvious than for others. In addition, making connections with your discipline’s professional societies may open up more information for you about diversity in the field, “best practices” that have worked at other institutions, or initiatives that you might tie into. There may also be specialized organizations within your discipline or field that have programs for specific groups. Partnerships with these organizations may provide even more resources to enhance diversity efforts.¹⁵

Finally, your program also fits into a regional and national context that cannot be ignored. Where your institution is located is important when looking at diversity rationales. If you are an urban campus, for example, diversity becomes a matter of educating those “in your backyard.” Diversity on a rural campus, on the other hand, might look at the necessity of providing students with a broad background, including the experience of interacting with a cross-section of students and faculty from many different backgrounds, which they might otherwise not get. Within the context of your state or region, diversity goals could tie into the populations, employment opportunities and workforce needs that are found in your area.

At the same time, your location may also constrain what you can or cannot do (see “Lawyers Predict...”). The Supreme Court ruling did not impact institutions in those states that are still under court ordered desegregation, for example. Institutions in those states must still comply with the federal court order. At the same time, the Supreme Court ruling did not nullify state

Lawyers Predict the Shifting Context for Higher Education Programs in the Next Five Years

In a supplement to *The Chronicle of Higher Education* (June 25, 2004, pp. B4–7) 10 legal experts offered their views on the most pressing issues that higher education institutions will confront in the next five years. Eight of the 10 mentioned “diversity” in various guises. All should be seen as catchphrases that signal the sites of future battles. Indeed, some are already underway: “maintaining academic standards,” “inclusion of minority students,” “enrollment management,” “the meaning of discrimination,” and “access and economic diversity.”

An anonymous lawyer consulting on this project offers the following illustration of why two lawyers might give conflicting advice regarding the legality of race-exclusive terms in financial aid based on the language of California Proposition 209, which stipulates that “The state shall not discriminate against, or grant preferential treatment to, any individual or group on the basis of race, sex, etc.”

The sustainability of such financial aid depends upon whether providing the aid constitutes “discriminat[ing] against” or “grant[ing] preferential treatment.” A strict statutory constructionist (or a very risk-averse lawyer) might argue that any decision giving a benefit (i.e., anything of value) based on race or gender would satisfy the definitions and therefore be illegal. However, a less risk adverse attorney would, indeed, have a credible argument that you have to look at the context. If a university administers large pots of financial aid with different criteria depending on the pot, it might be the case that providing aid on the basis of race to Student A is neither “preferential” to that student nor does it “discriminate against” Student B because Student B will simply receive financial aid from a different pot of money.

In this case, the counsel for the private scholarship donor should look at state judicial decisions to research whether a California state court has ever further defined either of these Proposition 209 terms under California law. If not, the counsel still might be able to extrapolate from other areas of state and federal law to bolster the argument that under Proposition 209, this situation is neither discriminatory nor preferential. It may be an uphill battle with a risk adverse university counsel because the desired result is not so clear cut here.

laws that forbid the use of race and ethnicity, for example, in institutional programming, such as those currently enacted in California and Washington State. In addition to the Legal Primer offered here, some knowledge of the laws and rules that guide affirmative action in your state or locality, as well as the authorized federal exceptions, is also essential (see Legal Primer for notable state-level laws).

6. Evaluation and Research

Theory: By now it should be obvious that your program or project should have research, evaluation and data collection components. It is through these types of painstaking evaluative efforts that the future of diversity efforts can be sustained to their obsolescence. In other words, prove that you are making a difference so that you can continue to make a difference until there is no need because there is no difference.

Project or program evaluations can be either formative or summative. Formative evaluations involve gathering data before and during the project or program to assess if what you plan to do and are doing is effective. Formative evaluations can lead to program or project changes or changes in emphasis as successes and failures occur. Summative evaluations, on the other hand, look at project and program activities over time to assess their overall impact retrospectively.¹⁶ Both are necessary for project or program documentation that assists in managing, monitoring, and manifesting what makes a difference with whom.

A recent report from the U.S. Government Accountability Office reviews the systems in place at four federal agencies to ensure that the universities receiving federal financial assistance from each agency are fully compliant with Title IX of the Education Amendments of 1972, which bans gender discrimination not only in women’s sports programs but in academic programs as well. The report concludes that the science agencies fell far short of the oversight that is directed by government-wide Title IX regulations, and that they must do more to ensure that universities benefiting from STEM funding guarantee women’s participation in university STEM programs.

In the Sciences, Agency Compliance with Title IX Lags

“Federal science agencies have made efforts to ensure that federal grant recipients comply with Title IX in the sciences by performing several compliance activities, such as investigating complaints and providing technical assistance, but most have not conducted all required monitoring activities. Specifically, according to [the Department of] Energy, NASA, and NSF officials, each agency referred complaints involving educational institutions to [the U.S. Department of] Education and those involving employment to EEOC for investigation.... However, agency officials told us that they could not determine whether grantees have investigated Title IX sex discrimination complaints they have received, since grantees are not required to report on their activities.... [O]nly Education has monitored its grantees by conducting periodic Title IX compliance reviews [those who already have received grant funding]... In this report, we are making recommendations to the Administrator of NASA, the Secretary of Energy, and the Director of NSF that they take actions to ensure that compliance reviews of grantees are conducted as required by Title IX regulations.”

Source: U.S. Government Accountability Office, Women's Participation in the Sciences Has Increased, but Agencies Need to Do More to Ensure Compliance with Title IX, GAO-04-639, July 2004.

Practice: An overall assessment of your university's or organization's diversity efforts is recommended. Dialogue should be open across the different schools and departments, involving program managers, faculty, department heads, and administrators through the sharing of evaluations and outcomes. Through these efforts, a meta-analysis of institutional programming could result that could broaden the scope of efforts as “best practices” are identified. In addition, at the institutional level, some efforts should be undertaken to evaluate the impact of diversity efforts on non-targeted populations.

Too often, however, studies fail to get beneath the surface of the “numbers” to assess the impact of cultural dynamics as success (or failure) indicators. So-called cultural studies look at the campus and classroom environment. They can identify attitudes, behaviors, and cultural variables—both institutional and group-based—that facilitate or inhibit the attainment of a desired “future state.”

The importance of such changes is evident on cam-

pus today. Offices of “quality improvement” and “institutional assessment” are common, as responses both to accountability demands of federal sponsors (as embodied by the Government Performance and Results Act of 1993) and the Baldrige quality movement that migrated from the corporate sector.¹⁸ Above all, “Environmental and experimental components of a diverse campus have positive affects on retention, overall college satisfaction, college grade point average, and intellectual and social self-confidence.”¹⁹

Over and above evaluation, we also need race-conscious action research—research that explores the impact of diversity on students, institutions, disciplinary fields, cities and regions, and the nation as a whole. Many scholars have been working for decades on the impact of diversity on both underrepresented and majority groups. This research should be used to inform decision making at all levels. We need to explore what has worked, why it has worked, and where it has worked to ascertain what is adaptable and scalable to a variety of circumstances. Currently, this research is scattered, with very few attempts to synthesize what we know in a meta-analysis type structure.²⁰

A clearinghouse for information on studies and ongoing action research efforts would provide ready references to program managers, college administrators, and university counsels who may feel under siege by groups targeting diversity efforts. No federal agency/department or nonprofit organization plays this role on a consistent basis, though organizations such as ACE, College Board, NSF, Sloan Foundation, and some corporate foundations try to fill these gaps. The more evidence that is presented, both on particular programs and projects and on the effect that diverse learning communities have at all levels, the more convincing will be arguments to maintain diversity efforts.

7. Faculty Recruitment and Retention

Theory: If there is one area where universities are on solid legal ground in promoting diversity efforts, it may be faculty recruitment and hiring. As federal contractors, universities are still bound by Executive Order 11246, which carries a requirement to develop

Diversifying the STEM Faculty

The need for a more diverse population of STEM faculty is compelling. According to NSF data, women Ph.D. scientists and engineers employed in educational institutions were less likely than men to hold the rank of full professor or to be tenured, even after adjusting for age or years since the doctorate (*Characteristics of Doctoral Scientists and Engineers in the United States: 2001*, Detailed Statistical Tables, National Science Foundation, 2003).

Doctoral faculty who are minority are barely visible regardless of field—less represented at the highest ranks and less likely to be tenured. African Americans and Latinos comprise about 3 percent of the engineering faculty, with even less representation at the full and associate professor levels (see the 2003 faculty surveys of the American Society for Engineering Education, www.asee.org).

Some strategies for building and maintaining a diverse STEM faculty include increasing the number of women and persons of color who are tenured and in upper level administrative positions. After all, tenured professors and department heads control resources, change values, promote excellence, and reward performance. Moreover, they wield influence by modeling faculty behavior. There is now research recognition of this, but solutions to making more of it happen—for the good of both the candidate faculty and the institution—remain elusive.

an Affirmative Action Plan that includes an analysis of the utilization and underutilization of minorities and women (see Legal Primer). It also requires that contractors reach out to a diverse pool of candidates, although the actual selection of an employee should be done regardless of race or ethnicity. In other words, not only are universities able to recruit based on diversity, they are required to do so!

Practice: Recruitment is the first step in the process of producing a diverse faculty. Single position searches differ from cluster recruitment, and specifying subdisciplinary areas of specialization further delimits the pool of eligibles. Retention efforts are also needed, especially when your “diversity hire” is the only one in a department or college. Once a new faculty member is hired, keeping track of her/him as s/he moves through the tenure process is of critical importance, especially so for women and minorities. Faculty searches are expensive and represent a net drain on

ever dwindling resources for colleges and universities. Those funds would be better spent trying to retain faculty by successfully moving them through the tenure process and then providing necessary resources to keep them.

Retention efforts, however, may challenge current university cultures by setting up different reward structures and changing the expectations of faculty and administrators. Experimenting with support measures such as making the tenure clock more flexible, and increasing the family-friendliness of university support structures, for example, may challenge existing notions of acceptable workloads and time commitments. Such efforts, however, have proven beneficial to both female and male faculty members.²¹

The concept of “critical mass” at the faculty-level is also important, though this may be of a different magnitude than “critical mass” in the student body. Hiring one faculty member from an underrepresented group may not be sufficient, and the likelihood of retention is greatly reduced. Building a community that includes professionals from all backgrounds and that is supportive is more likely to maintain successful diversity efforts at the faculty level.

8. Leadership

Theory: Everything we have discussed in these design principles is predicated on the need for a leadership willing to take risks in order to realize the rewards inherent in a more diverse campus or organization. But leadership at what level, and even if people want to do the right thing, do they know what to do?

There has always been a debate over whether change is more effective if it comes from the top down or the bottom up. The answer is that change must come from both directions—or risk failure. The Physics Department Head, the Dean of Engineering, the Chancellor or President may have a vision for where s/he wants the organization to go, but without convincing those below of the necessity of the vision, it is likely to go nowhere. Similarly, efforts to effect change by working hard “in the trenches” without the support of those above are equally futile. Leadership at all levels, therefore, must want the change if it is to be realized, sustained, institutionalized, and recog-

nized as an exemplar for the support of STEM in other educational settings.

Practice: Convincing those either below or above of the need for change requires clear and open communication. It also requires that positions and new initiatives are well-thought out and based on substantial evidence of the benefits of change. Finally, those who would effect change must be in a position to deal both with those who relish legitimate opposition and those who simply resist the need for change.

The need for research and evidence that makes the case for change is compounded when the political leadership of the region, state or nation does not support it. Standing one's ground becomes infinitely more difficult in situations in which there is little guidance

or outright opposition from the political leadership. Experience teaches that such opposition is never benign. Thus, joining together with leaders from other universities and organizations that support your change efforts, sharing convictions as well as information, and building a nation-wide community for change may go a long way to counteract reticent political leadership.

Summary

Design principles clarify the differences, often subtle, between intention and action, design and implementation, individual and group benefit. Above all, these principles remind us all of the tradeoffs inherent in

An Academic Leader Reflects on Leadership NACME's 2003 Reginald H. Jones Distinguished Service Award: An Excerpt from Acceptance Remarks by Charles M. Vest, President, Massachusetts Institute of Technology

During the last decade, the federal government has diluted its commitment to creating opportunity for minority citizens, but by and large, America's great corporations have stood strong and filled the leadership gap. Corporations have long supported both our admissions policies and our outreach programs. They have not done so because they are liberals or conservatives, Democrats or Republicans. They support them because they understand that the world is racially diverse—and that if they are to know their customers, produce well-designed, relevant products, and market them effectively, they need the perspectives and experiences of a diverse workforce and leadership.

As I stand before you today, I would like to give you a sense of where I have come from. I attended racially segregated schools until I was in junior high school. Our schools were desegregated in one fell swoop a year or so ahead of *Brown v. Board of Education*.

I came quickly to value and learn from the new classmates who joined us... My first science teacher was black. My high school physics teacher was a woman. My closest friend in graduate school was from India. My PhD advisor was from Turkey. My closest colleagues as a young professor were from Taiwan, Hungary, and Turkey. My own father grew up in a German-speaking household.

And yet, when I began my teaching career as a graduate student teaching fellow and then as an assistant professor at the University of Michigan in the 1960s, it was extraordinary if I had more than one African American student in my classes every couple of years. In fact, it was extraordinary if I had more than one or two women students in a class. And if I had either, it was a lead pipe cinch that they would be one of the best two or three students in the class, because only through unusual drive and commitment would these students have come to study engineering.

In that context, when I look today at an MIT student body whose undergraduates are 42 percent women, 6 percent African-American, 11 percent Latino, and 2 percent Native American—a student body that is remarkably diverse in so many other dimensions as well—it seems to me that a miracle has happened.

But it is not a miracle. It is the result of determined, conscientious effort, over more than three decades, often against seemingly insurmountable odds. It is the result of institutional leadership and occasional courage. It is a result of the determination of innumerable families and communities.

I know that I am richer, that my world-view is more balanced, and that my ability to do my job and live my life has been greatly enhanced because of my own experiences that can be filed under the heading of diversity. We must all work to ensure that the generations to come can experience the value of diversity as I have, and that they have a field of opportunity as broad as I was given.

Source: Daryl E. Chubin, ed., "Affirmative Action and the Future of Higher Education: A Collection of Remarks," Delivered at the NACME-GEM Conference, May 29, 2003, Houston, TX (www.nacme.org/).

decisionmaking. Yes, we want to preserve what works for students in certain contexts, subject to programmatic and legal constraints. Others would rather act as if higher education is context-free, color-blind, and “race-neutral” with academic preparation and opportunity distributed more or less equally. We can debate such assumptions endlessly—and fruitlessly.

While we sit and argue within our national borders, we must not forget two intrusive realities: the world is a dangerous and uncertain place, and science and technology play increasingly important roles in it. Who assumes those roles is not a benign question. We cannot turn back the population clock. Massive immigration may have slowed, but those who come to our shores, our cities, our universities, will only add to the rich diversity already residing within the student population. On what bases we afford opportunity will determine the breadth of the yield in educated talent. So long as we gauge—not pre-judge—potential along with accomplishment, we honor merit and advantage as well as history.

Epilogue

Since its founding, America has faced the challenge of navigating the mine fields of power, representation, and rights. Separation of powers and two separate chambers of Congress were devised to reflect public and state interests. The courts constantly reconsider the Constitution in light of changing circumstances. Just as the Constitution finds a path between rule of the majority and rights of the minority, so must we recognize rights of the individual and compelling interests of the State. For example, the military academy that makes an affirmative choice of a minority candidate may be exercising the right of weighing the individual against the compelling state interest to have an officer corps that is more reflective of its enlisted corps.

The rights of a person must be subservient to the compelling *national* need for good order and discipline within the military. Thus, the compelling arguments spelled out in the *amicus* brief submitted by retired generals and admirals in the Supreme Court admissions cases against the University of Michigan urge us to step back from individual rights long enough to consider collective state interest.

Education in and for a democracy; education in and for a multi-racial, multi-cultural society; education in and for global context; education in and for a world transformed by science and technology demand that we seek and find ways to negotiate power, representation, and rights.

ENDNOTES

1. The most recent, notable inventory is the report of the public-private partnership Building Engineering and Science Talent, or BEST, *A Bridge for All: Higher Education Design Principles to Broaden Participation in Science, Technology, Engineering, and Mathematics*, February 2004. For a summary of earlier literature on best practices and what works in the higher education arena, see p. 21 of this report.
2. For example, see Peter Schmidt, “Not Just for Minority Students Anymore,” *The Chronicle of Higher Education*, Mar. 19, 2004; and “Foes of Affirmative Action Push Colleges to Reveal Policies on Race-Conscious Admissions,” *The Chronicle of Higher Education*, Mar. 23, 2004; and Linda Bean, “Undoing Diversity: Profs, Students Join Anti-Affirmative Action Coalition,” *DiversityInc.com*, Apr. 1, 2004.
3. Robert D. Bickel and Peter H. Ruger, “The Ubiquitous College Lawyer,” *The Chronicle of Higher Education*, June 25, 2004. The authors go on to say “lawyers must collaborate with their clients throughout the institution to achieve institutional goals, a process that sometimes requires a balancing or reconciliation of competing rights and interests.”
4. National Association for College Admission Counseling, *Diversity and College Admission in 2003: A survey report*, September 2003, p. 1.
5. While institutions of higher education are the primary reference group to which these principles are oriented, most apply to other organizations dedicated to STEM education, especially national nonprofit and community based organizations (i.e., 501c3s). “Universities” are used here to encompass these various organizational types.
6. The difference is between data sources, e.g., NSF or the Bureau of Labor Statistics, and the interpretation of the numbers. How one displays the data can help impart or obscure significance. Unlike the aphorism, “data do not speak for themselves.”
7. For an excellent site that lists myriad sources on the research on alternative admissions practices and the benefits of diversity, see the University of Michigan’s site on the Admissions Lawsuits at www.umich.edu/~urel/admissions/
8. Thomas J. Kane, “The Long Road to Race-Blindness,” *Science*, vol. 302 (Oct. 24, 2003), p. 571.
9. Marta Tienda, “Affirmative Action and its Discontents: Lessons from the Texas Top 10% Plan,” U. of Michigan, Oct. 29, 2003 (www.texastop10.princeton.edu).
10. For other analyses that reach similar conclusions about percent plans as viable alternatives to race-conscious college admissions, see The Civil Rights Project (www.civilrightsproject.harvard.edu/).
11. Note that use of the word “Minority” is not in and of itself problematic. If the context indicates that underrepresented minorities will be targeted or encouraged to attend, then use of the word minority does not necessarily raise a red flag. However, in this case the context sounded as if the program were limited to minority students, which may be more problematic.
12. Some states (e.g., Mississippi) and universities are still under court order to desegregate. They do not need to justify special programs to promote minority admissions or services.
13. For specific information on the requirements of narrow tailoring and compelling state interests, consult the Legal Primer.
14. Kelly Wells, “An Unnecessary Slam at Stanford [letter],” *Washington Post*, May 15, 2005, p. A21.
15. There are many “minority-serving” and advocacy organizations—such as NSBE, SACNAS, AISES, GEM, and HENAAC; the discipline-specific professional societies; and the cross-cutting membership organizations with standing committees dedicated to increasing participation of scientists and engineers from underrepresented groups. For a guide, see the National Coalition of Underrepresented Racial and Ethnic Groups in Engineering and Science (www.ncourages.org).
16. A good overview of program and project evaluation is offered in NSF, Directorate for Education and Human Resources, Division of Research, Evaluation and Communication, *User-Friendly Handbook for Mixed Method Evaluations*, available in pdf format at http://www.ehr.nsf.gov/EHR/REC/pubs/NSF97-153/pdf/mm_eval.pdf.
17. This report was requested by Senators Ron Wyden and Barbara Boxer after a hearing on Women in Science conducted by the Senate Commerce Committee’s Subcommittee on Science, Technology and Space. See Legal Primer, *supra*, n. 6. Had a study been conducted under Title VI or Section 504 of the Rehabilitation Act to examine whether science agencies are ensuring that universities receiving federal funding do enough to guarantee nondiscrimination against racial and ethnic minorities and persons with disabilities, respectively, the results would have no doubt been similar. They may have shown even less compliance.
18. For example, see the National Consortium for Continuous Improvement in Higher Education (www.ncci.org).
19. Daryl G. Smith & Associates, *Diversity Works: The Emerging Picture of Student Benefits*, Washington, DC: Association of American Colleges and University, 1997.
20. The University of Michigan has compiled a very useful web site based on the Supreme Court cases that includes information on research done on diversity at the university (<http://www.umich.edu/~urel/admissions/research/index.html>). Also see the aforementioned reports from Building Engineering and Science Talent (BEST) at www.bestworkforce.org.
21. See Donna J. Nelson, “Diversity in Academia: A Look at Gender and Race/Ethnicity in Science and Engineering Departments,” *The FASEB Journal*, 2002, vol. 16, (4), p. A524; “Faculty Diversity in Mathematics Departments at the “Top 50” Research Universities,” *AWIS Magazine*, vol. 31, Summer 2002, pp. 42–46; and for data on women in top 50 doctoral-granting departments in U.S. universities, “A National Analysis of Diversity in Science and Engineering, May 2004, <http://cheminfor.chem.ou.edu/faculty/djn/djn.html>.

Appendix A: Report of a Joint AAAS/NACME Conference

Overview

The American Association for the Advancement of Science (AAAS) and the National Action Council for Minorities in Engineering, Inc. (NACME) hosted an invitational meeting January 15–16, 2004, in Washington, DC, focused on efforts to enhance minority participation in science, technology, engineering and mathematics (STEM) education and careers.

Over 180 distinguished policymakers, higher education officials, attorneys, program developers, and researchers participated in the conference the first day, followed by 100 who met in seven workshops the next day. One expected outcome was a report consisting of action items and an outline of next steps for sponsors, educators, and other stakeholders seeking to support STEM diversity. (No speakers are attributed below.) Other resources are posted at <http://ehrweb.aaas.org/aaconf/> and will be updated as a service to colleagues grappling with the issues addressed in the conference and workshop. The conversation must continue. As one speaker put it, “we seek solutions, not privileges, and a national policy dialogue that sharpens the focus on how to judge talent and invest in all.”

The conference and workshop was prompted by inquiries to AAAS and NACME about issues of policy and practice that have arisen since the Supreme Court decisions in *Grutter v. Bollinger* and *Gratz v. Bollinger* (June 23, 2003), which reaffirmed the value of diversity in making admissions decisions and clarified

what admissions practices are allowed. Murky still are questions about ongoing efforts, precollege to workforce entry, to support minorities in STEM careers. To clarify what is judicious and strategic, the meeting focused on three broad questions:

1. What is allowed—and prohibited—in recruitment, admissions, financial aid, and special programs and activities for enrolled students?
2. Are efforts currently in place legally defensible, likely to achieve the ends for which they were designed? Are they both effective and compliant with the law?
3. How do we move forward, informed by the input of research, evaluation, and the wisdom of practice, coupled with guidance from the Court?

Rationale and Charge

This was a conference about means, not ends. The participants were invited because they support a diverse workforce and the student body that will sustain it. As the title of this report, excerpted from Lyndon Johnson’s commencement address at Howard University in June 1965 augurs, achieving these ends will pose enormous challenges to institutions of higher education, especially those determined to support diversity in populating their campus communities. In the words of attorney Martin Michaelson, circa 2003, “To the extent that they have implications for affirmative action in faculty and staff recruitment, hiring, and promotion, in student aid, and in other

areas, the [Supreme Court] decisions affect nearly every academic institution in the country.”¹

We are 50 years from *Brown v. Board of Education*, and 25 from *Bakke*. Thus, race-conscious policies have been the law of the land for much of recent U.S. history. Without such sensitivity in college admissions decisions, higher education would simply reproduce historical inequities in preK-12 preparation. Thus, colleges and universities must formulate strategies and practices that afford opportunity while maintaining fair and competitive processes. And the partners of academic institutions are rallying to support what works and what other approaches should be considered on campus and in their own organizations.

Why science and engineering? Since NDEA—the National Defense Education Act of 1958 (PL 85-864)—these have been recognized as significant disciplines for the nation’s well-being, especially for federal investment at the graduate level. College-educated, graduate-trained people matter. If minorities and women participated in the science and engineering workforce proportional to their presence in the general population, there would be no U.S. talent gap. That is why a focus on STEM at all levels of education is vital.

Those who have worked on participation for all students know that “getting in” is only a small part of the battle.² It has been demonstrated time and again that the success of these students in STEM fields requires more intervention, more outreach, more support, research opportunities, retention efforts and more mentoring than is usually offered in the typical program, especially in research-intensive universities. In contrast, liberal arts colleges and minority serving institutions have traditionally done a much better job in offering a supportive environment.

At a time when the policy climate is revisiting and renegotiating, if not redefining, concepts such as academic selectivity, race surrogates, underrepresentation, critical mass, privilege, denial of rights, affirmative action, and discrimination, legal scholars remind us that the Court decisions do not *require* diversity programs, just permit them. Therefore, initiative resides with institutions and those who lead them. As one lawyer observed, “this is a ‘constitutional moment’ for defining the educational mission in a democracy. We must reassert education as a

public, not a private, good. Higher education cannot be picking winners and losers. We are fighting for the soul of America.”

For grounding, the conference highlighted research and data on demographics, enrollments, degrees, and composition of the workforce. For perspective, it introduced separate panels of representatives from academe, industry, and government, leavening these views on how policy and practice can promote the participation of all in science and engineering with the legal opinions of the panel moderators.

While looking back to establish historical context, the conference fixed on the future. We were evermindful that Justice O’Connor’s brief articulated a vision of an academic world 25 years hence without the need for measures that assure equal opportunity and treatment for all. Together, the participants were charged with detailing a vision with concrete actions, a timetable for progress, and collective strategies—both compelling and nuanced—for sustaining a diverse corps of students, faculty, and knowledge workers circa 2030.

The Conference: Setting the Stage

To begin to explore the guiding questions of the conference, the organizers deemed it necessary to establish the context for discussion. We used the lens of history (admittedly, with a public-policy-inside-the-Beltway focus): Where did efforts to broaden the talent pool originate, how were they manifested, how have they evolved, and what have we learned?

A 30-year retrospective clarifies not only milestones in minority STEM participation, but also the epochs around which events crystallize (The complete timeline can be found in Appendix B).³ They represent an evolution of approaches that reflect learning in the face of shifting public policies and public opinion.

The civil rights movement, propelled by the Great Society programs of the 1960s, defined the issue of opportunity, in President Johnson’s stirring words, “as not just equality as a right...[but] equality as a result.” With the need to increase both the visibility and advancement of women and minorities, institutions began to converge.

Intervention programs appeared; professional society committees were formed; resolutions were

passed; explicitly minority-serving organizations formed; Congress mandated programs, often aimed at Historically Black Colleges and Universities (HBCUs); and some nonprofits like AAAS began to document the dimensions of the challenge. The mantra was: we've got to *do* something.

For example, in 1971 the AAAS Council passed a resolution of support for these ideals that led to the establishment of a Committee and Office of Opportunities in Science to oversee the course of this work within the Association. The American Chemical Society established Project SEED, a program for “disadvantaged youth” in 1968. MESA began in California in 1970. Scientists at Lawrence Livermore Laboratory developed inexpensive science materials for use in the Oakland schools in the late 1960's. Efforts focused on trying to improve the quality of school science and mathematics. Concerns from industry about the adequacy of the numbers of minority engineers and scientists available for employment led to the formation of the National Advisory [later, Action] Committee for Minorities in Engineering, or NACME, under the auspices of the National Academies.

Universities put initiatives in place. Agencies organized and funded programs, often aimed at institutions, first HBCUs, later Hispanic Serving Institutions and Tribal Colleges. These would include MISIP at the National Science Foundation, Preface at DOE, and the MBRS/MARC Programs at NIH (see www.nigms.nih.gov/news/mpusummer02/history.html).

By 1975, we had recognized the need for data disaggregated by sex within race/ethnicity since both factors interacted to shape educational experiences and workforce opportunities. AAAS in particular was challenged to include concerns about persons with disabilities within the mandate of the Committee and Office of Opportunities in Science. This was done in 1976, and soon concerns about persons for disabilities in the STEM talent pool and workforce were added to CEOSE and, in a later reauthorization, as an amendment to the Equal Opportunities Act of the NSF. Disability legislation affected access to schooling, to university, and to the workplace.

The population of “persons with disabilities” is one that any person can join at anytime. And the barriers to opportunities thus presented, especially when

added to race and/or sex, mean that a much more sophisticated and nuanced view of interventions need must be incorporated into our analyses.

In a 1976 report, *Programs in Science for Minority Students, 1960–1975*, Malcom, Cownie and Brown identified 355 programs, more in health- and engineering-related fields than in the sciences. African Americans were better represented among program participants than Latinos and Native Americans, in part due to the fact that many such programs were based in HBCUs.

In terms of level, over 45% of programs were aimed at the undergraduate level exclusively, while only 7% and 18% were specifically aimed at elementary and high school levels, respectively. In those programs operating at multiple levels 41% had some pre-college involvement though there was little opportunity or deliberate strategy for follow through. The authors concluded:

“it is clear that special programs, while absolutely essential to increasing the numbers of minority group members entering the sciences, address only part of the problem and are only part of the solution. Increasing doubt as to the future of special programs gives an additional indication that major institutional change is absolutely essential if significant and continuous increases are to be made in the participation of all these groups in science, engineering and health fields.”

This focus on finding the individuals with interests and capacity extended through to the graduate level, such as with the creation in 1978 of the congressionally mandated MGF program at NSF. A notable exception to this emphasis on individuals was the NSF Resource Centers for Science and Engineering, also a congressionally-mandated program promoted by many within minority science and engineering organizations, such as SACNAS and NOBCChE, that urged more holistic, longitudinal, and system-wide efforts.

The 1970s had intensified the targeting on individuals and set-asides known as “special programs.” Then came *Bakke*, affirming the value of diversity in higher education but sending mixed messages about the future of special programs. Despite these efforts, the numbers, while increasing, were not moving significantly for minorities. The realization that competi-

tion among fields would not increase the overall pool of talent, and that there was a need to start *much* earlier to identify, inform, and develop students.

Consequently, the early 1980s spawned the concept of “pipeline” and programs that emphasized academic preparation and career decisionmaking by high schoolers. The effectiveness of programs—more students, better preparation for the dollar—was asserted, but seldom evaluated. Specific legislation that articulated the federal stake was vitally important. With the passage of the NSF Equal Opportunities in Science and Engineering Act of 1980, a federal agency was charged with the responsibility of increasing participation in science and engineering by underrepresented groups. NSF remains unique today among the federal R&D infrastructure with that charge.

But the impetus in the early 80s yielded landmarks reports rather than results. Indeed, the Reagan Administration shut down science education at NSF in 1981, derailing the strategic vision outlined in the Act. Two years later, we were declared “a nation at risk,” and in that same year the National Science Board published an overshadowed report including a rationale for investment in human resources for science and engineering, *Educating Americans for the 21st Century*. It included an inventory of programs from the previous era aimed at minorities, women, and persons with disabilities, and codified lessons that seem unremarkable yet prescient by today’s standards.

AAAS’ *Equity and Excellence: Compatible Goals* offered a blueprint for uniting, rather than choosing between, the goal of participation and the goal of science and engineering strength. It observed that:

- ▶ programs were created & existed in a kind of “parallel universe” to schools as a way of helping students survive in a system unsupportive of SMET career aspirations or preparations;
- ▶ the most successful efforts focused on enrichment rather than remediation, had broad partnerships, good teachers with high expectations for students, parental involvement, opportunities to “do science,” project based work, careful targeting, and long term involvement with participants;
- ▶ most tried to track outcomes for their students; and
- ▶ over time the most successful projects managed to worm their way into school systems to affect

teachers, curriculum and/or career orientation. By just “following their instincts” (sometimes even informed by evaluation and feedback), many program developers had found lessons to inform us all: that quality science and mathematics in a supportive and challenging environment could produce the results we all desired.

By now Congress was actively directing the R&D agencies to create programs for bringing more women & minorities into the S&E workforce. As concerns about the adequacy of the workforce grew (especially in light of emerging demographic shifts), Congress charged the Office of Technology Assessment with looking more carefully at the human resources base of the United States, as well as how the system of federal support contributed to the production and sustenance of that base. A series of path-breaking reports from OTA⁴ connected the underparticipating groups and their “parallel universe” to the fate of the larger scientific and engineering enterprise.

After the OTA reports framed the S&E enterprise in terms of national need, the expectations for the universities—as the primary actors in the integration of research and education—were explicit. Their attention to the composition and adequacy of the S&E workforce, in addition to the production of knowledge, grew accordingly.

In the late 1980’s, the demographic era was in full swing. AAAS undertook a study of intervention programs in universities, reporting its findings in reports such as *Investing in Human Potential: Science and Engineering at the Crossroads* (Matyas and Malcom, 1991). The university became the unit of analysis rather than individual projects, and an attempt was made to see what was in operation, how they were organized and situated within the institution. The dominant model was a collection of unconnected, uncoordinated non-interacting projects. Though many were effective and others noteworthy, taken together they did not move toward institutional change. Their funding base was fragile and there was often little knowledge of or sharing of lessons across efforts on the same campus.

At about the same time, the Carnegie Corporation of New York funded a comprehensive study and planning effort to set out goals and strategies for achieving Quality Education for Minorities, including goals

related to S&E participation. The study, originally conducted as a project based at MIT, evolved into the founding in 1991 of a separate independent organization, QEM, headed by one of its founders, Shirley McBay.

In 1990 AAMC undertook to dramatically increase the number of American Indians, African Americans, and Latinos in medical education. Project 3000 by 2000, directed by the late Herb Nickens, involved working with medical schools to identify effective efforts and to share these more widely. Medical school enrollments did rise for minority students, reaching a peak in 1994.

But with the Adarand decision, Proposition 209 in California and Hopwood in Texas, all happening in 1995, enrollments dropped. From 2,014 matriculants in 1994 and about the same number in 1995, medical school enrollees fell to 1,906 in 1996 and then to 1,770 in 1997. The number of placements remained the same at about 17,000 students. California and the Hopwood states accounted for 82% of the decrease in underrepresented minority matriculants between 1996 and 1997.

AAAS sought to determine whether similar losses had occurred among minority students in terms of first-year enrollments in graduate education in S&E. With support from the Sloan Foundation and in partnership with the Council of Graduate Schools and the Association of American Universities, we surveyed 93 Research I institutions to determine first year S&E graduate enrollment by broad field for 1994–45, 95–96, 96–97, and 97–98 for African Americans and Hispanics. We also visited 10 representative campuses and spoke with majority and minority students, graduate school leaders and staff, and S&E faculty. The surveys showed the same pattern of decline as seen in medical schools, steadily increasing or stable numbers through 1996, with a decline of roughly 20% and over 16% for Blacks and Hispanics, respectively, in natural science, computer science, mathematics and engineering fields (contrasted with an overall decline that was about half this).

Visits to the campuses revealed the uncertainty and confusion of administrators, post-*Adarand*, about what was or was not allowed in terms of recruitment, outreach, and admissions. In the face of this uncertainty, they often backed away from earlier efforts.

Combined with the fragmented nature of decision-making regarding graduate school admission and financial aid, it was difficult to identify a clear target for intervention. In retrospect, one might ask why we entertained any expectation that the graduate enrollments might be increasing. The effectiveness of the NSF Louis Stokes AMP program had greatly enhanced the size of the pool; and its focus on undergraduate research experiences had primed the pump for universities seeking talented minority students.

The Sloan Foundation funded AAAS, in the wake of the 1995 Adarand decision, to conduct a workshop to examine the changing policy climate and its effect on efforts to achieve STEM diversity. Two major recommendations that emerged are still valid today: the essential need for structural reform in higher education; and a call for rigorous review, reassessment and realignment of existing programs, to wit, “A strategic, ongoing review to assess the effectiveness, the adherence to best practices, and the long-term effect on the educational system is long past due.”

Soon thereafter in the late 90s, and at the request of Senator Robert Dole, the CRS of the Library of Congress, collected “any statute, regulation or executive order which appears, in any manner, to prefer or consider race, gender or ethnicity as factors in federal employment of the allocation of federal contracts or grants to individuals of institutions.” Within the Clinton White House, the President’s Initiative on Race and a five-month study was underway.

The resulting publication, “Affirmative Action Review: Report to the President,” ushered in the era of “mend it, don’t end it.”

The review within agencies led to:

- ▶ a reshaping of their program portfolios (for example, changes in eligibility language or the discontinuation of targeted efforts focused on individuals);
- ▶ a reframing of program rationale (from more minority physicians and/or biomedical researchers to the tools and personnel to address minority health disparities);
- ▶ more efforts aimed at institution-wide change (e.g., NSF’s ADVANCE), at strengthening the capacity of minority serving institutions, and of building connections among research universities and MSIs;

- ▶ the search for surrogates of race/ethnicity; and
- ▶ a consolidation and disappearance of special programs as the impact of the Government Performance and Results Act began to ripple through the Congress, enshrining “accountability” as the touchstone of budget blessings.

By the new millennium, there was a clarion call for institutional change. The report of the Morella Commission, *Land of Plenty* (2001), articulated the national interest in research-based program design and practice. With the creation of the public-private partnership BEST (Building Engineering and Science Talent) as implementation of the Commission’s work, we await the next installment of community-wide, cross-sectoral efforts to test the BEST design principles, as embodied in three forthcoming reports (www.bestworkforce.org).

In 2004, the beginning of an era demarcated by the Michigan Supreme Court decisions, we must assess the environment for participation of all in science and engineering. We turn to the communities of K-12, higher education, and workforce specialists who, along with other citizens, share a stake in America’s future. Representatives of those communities offered perspectives at the Jan. 15 conference—through university, government, and industry panels—that moved the conversation forward. Below we summarize those panels and the stage they set for a day of concurrent workshops.

A. University (President) Perspectives

Higher education plays a pivotal role in meeting the challenges posed by Court’s decision in *Gratz*. In the words of a Hogan and Hartson brief, “how institutional programs are conceived, expressed, and implemented . . . ensure[s] that the programs are appropriate under applicable legal standards and fit the institutional mission and goals.”⁵

The university presidents, representing public and private institutions, described a U.S. “innovation system” dependent on an engaged citizenry. How to make science and engineering careers attractive to domestic students is now an imperative. Higher education in particular must work to diversify the student body and not blame the K-12 sector for loss both of interest in science and engineering and the competi-

tion of these professions for fresh talent. Staying the course and leveling the playing field will render the debate over special programs moot.

But building a diverse student body, especially in the most selective institutions, takes decades of work, dedicated programs and staff, and recognition that a complex web of factors underlies the performance gap. Witness the inescapable reality that economic proxies may attenuate the effects of race/ethnicity, but do not erase them. As we “raise all boats” in teaching, learning, and the quality of student life—mentoring and peer tutoring *do* make a difference—the need to target efforts persists. Bridge programs and other pre-college outreach activities work. If we eliminate targeting, gains in preparation for and access to higher education by many will suffer.

One reading of the Court’s decisions, then, is that we can embolden or dilute current efforts: how do we “create opportunity for some students without destroying it for others”? Perhaps the most confusing, troubling, and frustrating challenge we face is the compulsion to modify programs that work! We should resist a rush to judgment while protecting those practices that have yielded opportunities where previously they were slim or nonexistent.

If we have been granted a period of reprieve by the Court’s pronouncement, then we should:

- ▶ explore how the tool of affirmative action may be used to fortify states and campuses backing away from race-conscious programs, not only in undergraduate admissions but also in financial aid. The next arena for legal contention is state legislatures.⁶
- ▶ learn about and export successful programs, including the context in which they thrived; and
- ▶ extol and point to extraordinary leadership—both within the higher education community and beyond in industry and government.

Finally, the university presidents warned of a splintering among groups as we devise multiple “solution paths.” If we are to change the debate, the link between education and democracy must be strengthened. The problem is embedded in a larger space of grander scale. It demands public will. For at the end of the day, diversity is an issue of social and political justice. The science and engineering communities must therefore join the public policy fray. How to weave diversity into the fabric of higher education’s

mission and values is a test of leadership, of resource distribution, of partnership among institutions.

Outstanding questions: What discretion do institutions have over the programs they offer? Does it vary with the source of funding? Are private institutions more or less advantaged in pursuing diversity? What, if anything, might differ in their responses strategies?

B. Federal Government (R&D Agency) Perspectives

Since the Great Society programs of the 1960s, the federal government has been at the forefront of assuring equal opportunity as a compelling interest in American life. Pell Grants and others financial aid programs that make college a reality for many. But science and engineering education is a particular area of human resources investments—through graduate fellowships, traineeships, and research assistantships (tied to individual investigator and center grants). Six R&D agencies—NIH, DOE, DOD, USDA, NASA, and NSF—provide the lion’s share of support for the production of new knowledge and the next generation of researchers/innovators.

The federal role, however, extends well beyond dollars. As an authoritative voice of science and engineering expertise, and as a symbol of the nation’s capacity to innovate, the federal sector is synonymous with glimpsing new frontiers of knowledge.⁷ Designing programs—preK through workplace entry—to achieve national goals and agency missions in science and engineering while maximizing opportunities for preparation and participation in the S&E workforce—in federal laboratories as well as academic and industrial settings—has long been a priority. How those efforts can be accelerated, coordinated, and scaled remains a formidable challenge.

The Court decisions seem not to have affected the way agencies allocate funds. Yet oft-heard claims that diversity enhances the scientific process, and therefore progress, lack evidence. Beyond dispute are the health disparities that can be demonstrated in access, quality of care, and the knowledge base that distinguishes, for example, disease propensities by race, ethnicity, and gender.⁸

The federal representatives, while circumspect, were unequivocal about the assets that must be preserved: the identification of student talent, the provision of cutting-edge research opportunities with world-class instruments and committed mentors, a recognition that not all scientists and engineers are PhDs, a healthy respect for skills that satisfy market needs, and the drive to push the envelope and reward what works (increasingly, by “implementation audits” of facilities and programs that document outcomes).

The use of criteria that explicitly support diverse participation by the citizen talent pool, reinforcing organizational units—centers and programs—as well as practices that leverage federal investments in the S&E enterprise, is at a premium. Unfortunately, the political climate militates against more active encouragement of minority participation by the White House or its Office of Science and Technology Policy (OSTP).

Outstanding Questions: Do institutional programs qualify as an antidote to targeted programs? When the Department of Education’s Office for Civil Rights inquires about the narrow tailoring of programs funded through a department/agency, how do they respond? What would it take for OSTP to play a larger role under in coordinating diversity programs and executing congressional mandates within the missions of individual departments and agencies? In the same vein, could the National Science Foundation’s Equal Employment Opportunity mandate be used more effectively?

C. Industry Perspectives

While the science and engineering workforce represents only 5 percent of America’s workers, the national welfare increasingly depends on them—not only for research and innovation, but for the skills, knowledge, and excellence they bring to other occupations and fields. High-tech companies, representing in the panel the information technology and pharmaceutical industries, often say that they have made the “business case for diversity.” They declare that expectation in evaluating managers’ performance, awarding vendor contracts, mentoring and promoting staff, and marketing the product line. Business strategy teams build relationships and networking skills both

internal and external to the company. Diversity is visible in the bottom line.

If corporate America “gets it,” then valuing diversity is intrinsic to the “knowledge supply chain.” This is apparent if one sees the workforce as part of a system where teaching and learning at all ages matter. For example, higher education owns K-12 teacher preparation, so its leadership in this arena is crucial. Some also advocate more naked political action, such as universities reaching out to enlist corporate lobbyists if legal challenges to diversity programs are mounted. While politicizing the battle, it narrows risks to those that matter the most. Finally, a better mapping of corporate diversity to educational efforts could create a “DiversityInc. Top 50” for institutions of higher education. It might also modulate the stealing of “seed corn” by hiring talented minority S&Es who would otherwise pursue graduate study.

The industry voice was one in stating that the Court decisions have not changed company recruitment and hiring practices at all. They still seek graduates with abundant “soft skills”—communication, teamwork, motivation, and a problem-solving style that is open to those with diverse backgrounds and perspectives. Combined with technical knowledge, such skills afford one the versatility to excel in a corporate S&E career.

Outstanding Question: What specific challenges do different industries face relative to others in the competition for student talent?

A synthesis of the day reminded us what constitutes a national phenomenon must be confronted daily by each of us in our communities. There is a differential impact of law and policy on practice by region, university, and school district. If education values opportunity and participation, then more than career outcomes are at stake. Rather, citizenship and the constitutional right to enter the mainstream of society are protected.

The Workshops

Day 2 of the conference featured a series of work groups, ranging in size from <10 to 25 self-assigned volunteers, that met concurrently. Each group focused on a particular theme that both grew out of the conference proceedings the day before and/or was anticipated by the organizers. The themes were:

- ▶ Collaboration
- ▶ Program Guidelines
- ▶ Research/Building the Case
- ▶ K-12 Outreach
- ▶ Financial Targeting
- ▶ Graduate and Professional School Admissions

Each group was charged with assemble information, especially research findings, based on the experiences and judgments of those in the room. Anonymity was assured, with no attribution of individuals in summary reports (not to exceed three slides) presented to the full assembly by each group facilitator. The following template was suggested to help standardize the output:

1. Scope of the topic addressed by the group (what was included/excluded)
2. Knowledge base (what is known, especially with data)
3. What key information is lacking
4. Demonstrable successes: a description of what works
5. What’s been tried, and failed
6. What organizations are among those to be consulted

These reports contained valuable insights that are incorporated into the design principles featured in this guidebook. In sum, they represent advice to those “on the ground” on how to “stand our ground.”

ENDNOTES

1. Martin Michaelson, "The Court's Pronouncements Are More Dramatic and Subtle Than the Headlines," *The Chronicle of Higher Education*, July 18, 2003.
2. Indeed, the Sloan Foundation supported AAAS in conducting a survey to gauge the impact of the Adarand, Hopwood, and Proposition 209 decisions on graduate admission and financial aid for underrepresented minorities seeking to pursue PhDs in science and engineering at research universities. The result, a forerunner of the present report, was Shirley M. Malcom et al., *Losing Ground: Science and Engineering Graduate Education of Black and Hispanic Americans* (Washington, DC: AAAS, 1998).
3. The complete timeline can be found in Appendix B.
4. Notably, U.S. Congress, Office of Technology Assessment, *Demographic Trends and the Scientific and Engineering Work Force* (1985) and *Educating Scientists and Engineers: Grade School to Grad School* (1988).
5. In Gretchen W. Rigol, *Implications of the U.S. Supreme Court Decisions in the University of Michigan Admissions Cases*. Summary of the Proceedings. The College Board, Summer 2003, Appendix D.
6. Peter Schmidt, "Washington's Governor Proposes Amending '98 Ban to Allow Return of Race-Conscious College Admissions," *The Chronicle of Higher Education*, Jan. 14, 2004.
7. For example, last year the National Science Board held a hearing with a focus on NSF and its main research university constituency. See Jeffrey Mervis, "NSF, Academics Told to Act as If They Mean It," *Science*, vol. 301, Aug. 22, 2003, pp. 1030–31.
8. In addition, minority enrollments in the health-care professions continue to lag growth in the general population. See American Association of Medical Colleges, *Assessing Medical School Admissions Policies: Implications of the U.S. Supreme Court's Affirmative-Action Decisions*, 2003 (www.aamc.org/morediversity); Katherine S. Mangan, "Institute of Medicine Urges Health-Care Educators to Take Steps to Increase Minority Enrollments," *The Chronicle of Higher Education*, Feb. 6, 2004; and Michael Nettles, Catherine Millett, and Joyce Wahr, "The Chronic Underrepresentation of African Americans in Medicine," *ETS Policy Notes*, vol. 12, Winter 2004.

Appendix A: Select Data Compendium

Commission on Professionals in Science and Technology

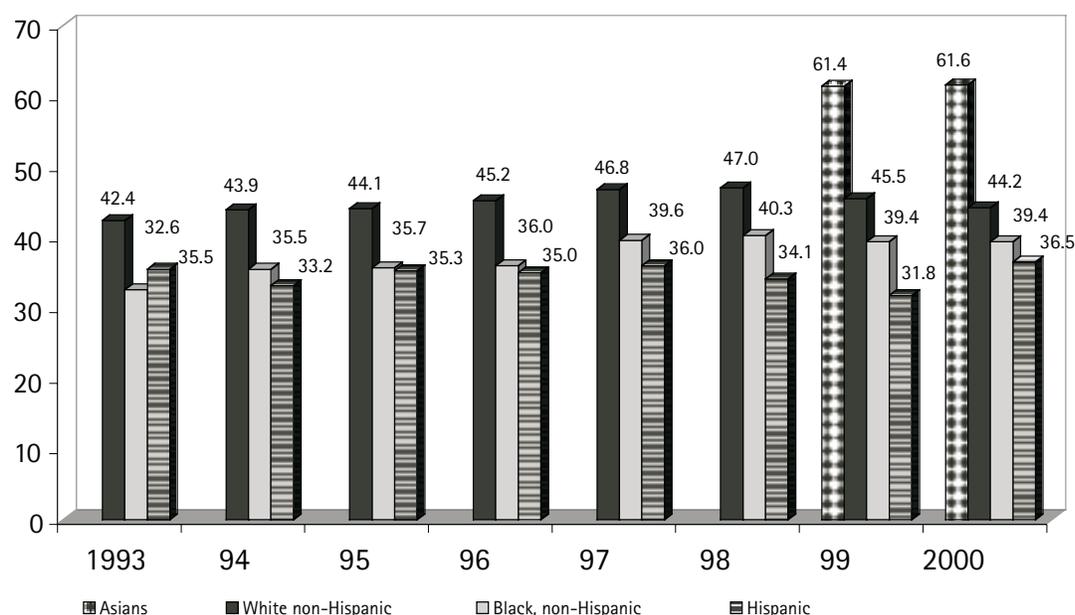
Evidence of Underparticipation

Sex, Race/Ethnicity and Disabilities	Percentage U.S. Population 1999	Percentage Total Workforce 1999	Percentage S&E Workforce 1999
White men	35.2	39.9	63.2
White women	36.7	34.8	18.6
Asian men	1.8	2.0	8.4
Asian women	2	1.8	2.6
Black men	5.7	4.9	2.1
Black women	6.4	5.9	1.3
Hispanic men	5.8	5.9	2.4
Hispanic women	5.7	4.2	1.0
American Indian men	0.4	N.A.	0.2
American Indian women	0.4	N.A.	0.1
Persons with disabilities	~20	N.A.	N.A.

Source: CPST, data derived from National Science Foundation, SESTAT and U.S. Census Bureau, Current Population Survey, March 1999, and NSB, 2002.

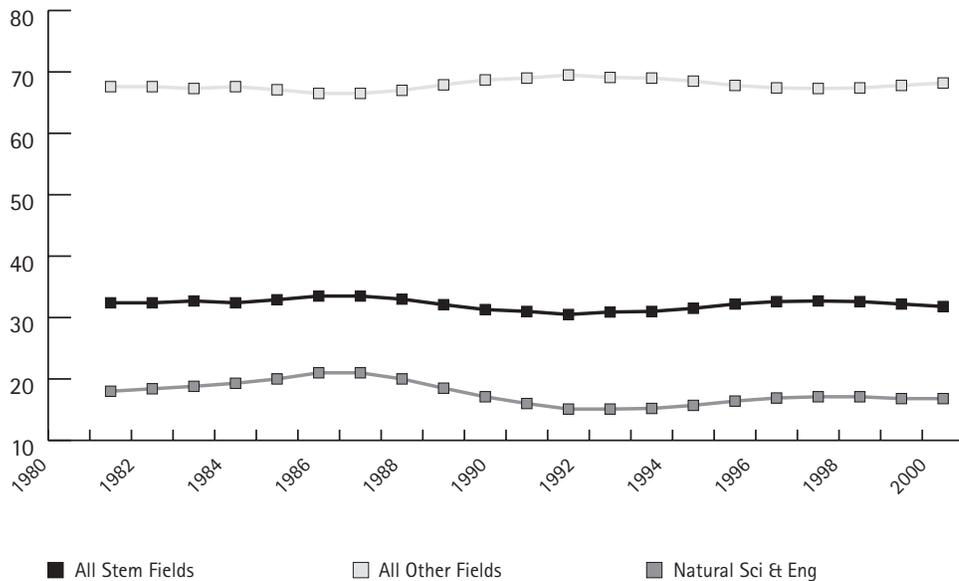
Note: Totals may not add to 100 due to rounding.

Enrolled in College Participation Rates for 18-to-24-Year Old High School Graduates by Race and Ethnicity: 1993–2000



Source: CPST, data derived from U.S. Bureau of the Census

Percentage of Bachelor's Degrees Awarded in STEM and Other Fields, 1980–2000



Source: CPST, data derived from NSF Web CASPAR

African American Top 15 Baccalaureate Awarding Institutions in the Physical Sciences

1. Xavier University
2. Howard University
3. Tennessee State
4. Lincoln Univ
5. Jackson State
6. CUNY City College
7. Spelman College
8. Dillard Univ
9. Florida A&M
10. North Carolina State
11. Southern University and A&M College
12. Morehouse College
13. Georgia Southern U
14. Fisk Univ
15. Georgia State

Source: CPST, data derived from NSF Web CASPAR

African American Top 15 Baccalaureate Awarding Institutions in the Biological and Life Sciences

1. Xavier University
2. Howard University
3. Hampton University
4. Jackson State Univ.
5. South Carolina State
6. Univ. of MD College Park
7. Florida A&M Univ.
8. Tuskegee Univ
9. Tennessee State
10. Prairie View A&M
11. Alcorn State
12. Morehouse College
13. Grambling State
14. Oakwood College
15. Georgia State

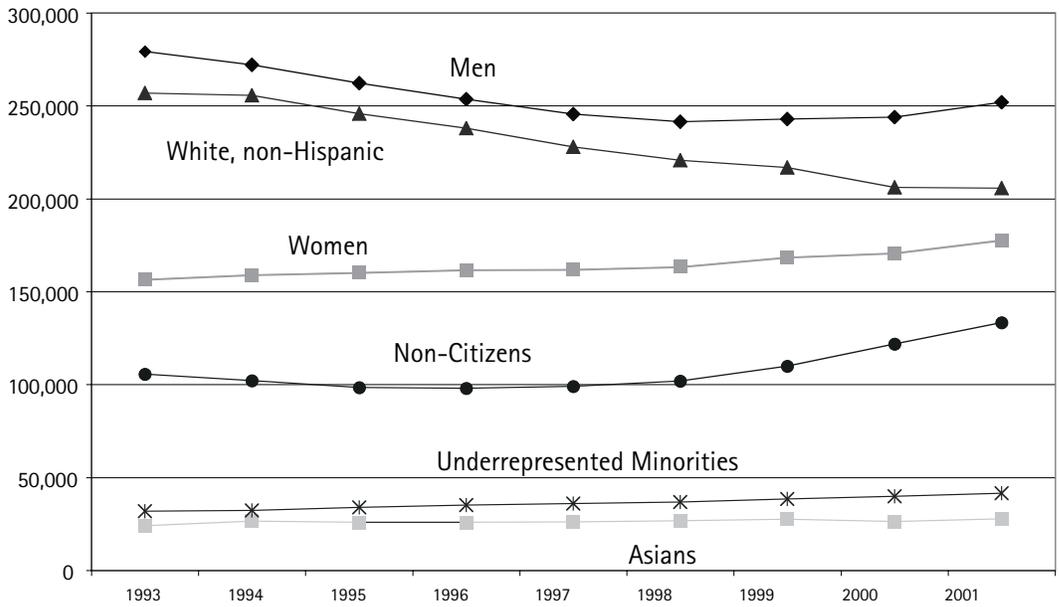
Source: CPST, data derived from NSF Web CASPAR

African American Top 15 Baccalaureate Awarding Institutions in Engineering

- | | |
|----------------------------------|----------------------|
| 1. Georgia Tech | 9. Univ. of Mich |
| 2. North Carolina A&T | 10. Mich. State |
| 3. Florida A&M | 11. Tennessee State |
| 4. Morgan State Univ | 12. Clemson Univ |
| 5. Tuskegee Univ | 13. VA Tech |
| 6. Southern Univ and A&M College | 14. Univ of Maryland |
| 7. Prairie View A&M | 15. Univ of Florida |
| 8. North Carolina State | |

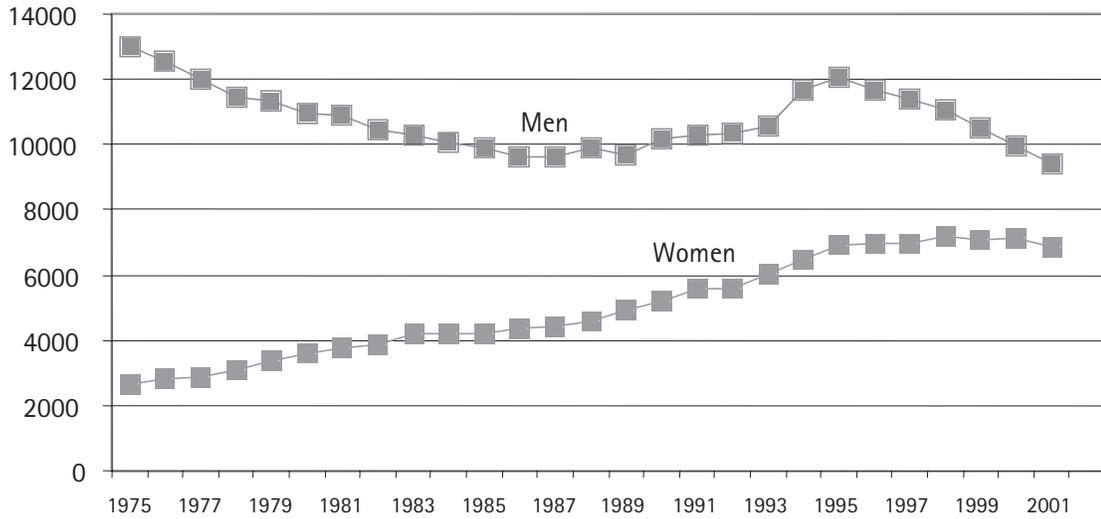
Source: CPST, data derived from NSF Web CASPAR

Graduate Enrollment in Science and Engineering, 1993–2001



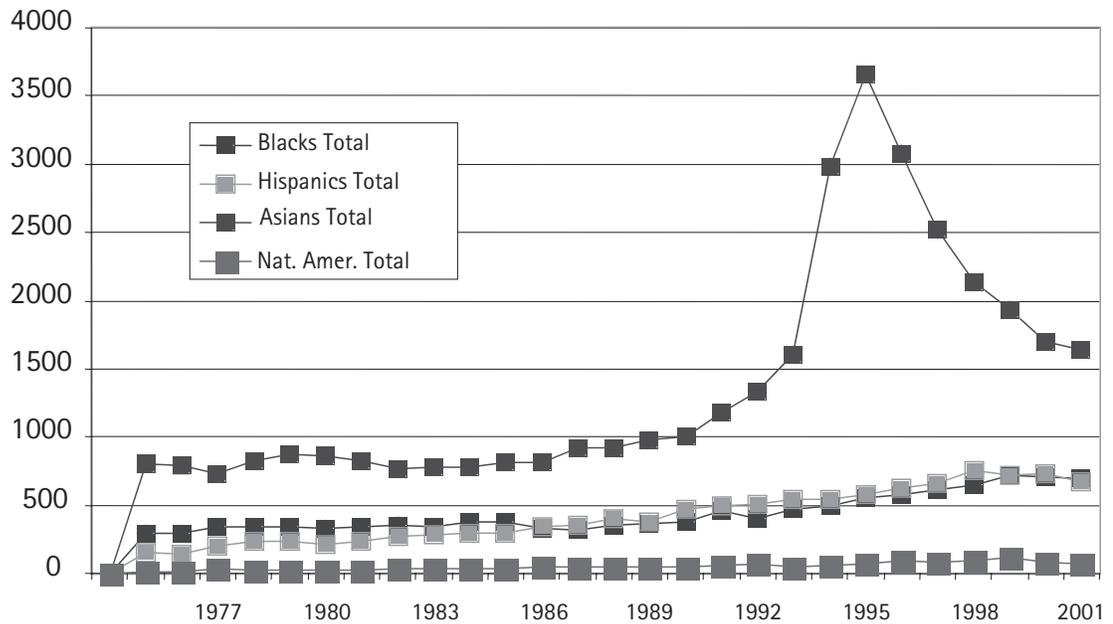
Source: CPST, data derived from National Science Foundation

PhDs in S&E by Gender, 1975–2001 (U.S. Citizens and Permanent Residents Only)



Source: CPST, data derived from National Science Foundation.

PhDs Awarded in S&E by Race/Ethnicity, 1975–2001 (U.S. Citizens & Permanent Residents Only)



Source: CPST, data derived from National Science Foundation

African American Top 15 Baccalaureate Origin Institutions of Science and Engineering Doctorate Recipients, 1997–2001

- | | |
|-----------------------------------|--------------------------|
| 1. Howard University | 9. UC-Berkeley |
| 2. Spelman College | 10. Univ of Maryland |
| 3. Hampton University | 11. Univ of Michigan |
| 4. Morehouse College | 12. Stanford Univ |
| 5. MIT | 13. Xavier University |
| 6. Harvard Univ | 14. Jackson State Univ |
| 7. North Carolina A&T State Univ. | 15. North Carolina State |
| 8. Southern Univ | |

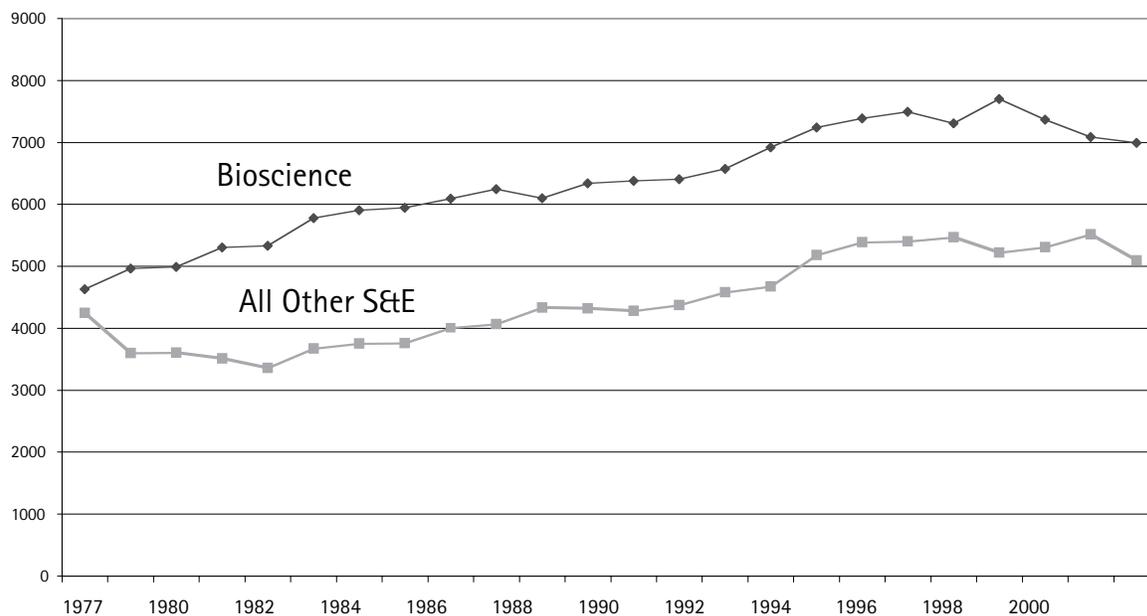
Source: CPST, data derived from NSF Web CASPAR

Hispanic American Top 15 Baccalaureate Origin Institutions of Science and Engineering Doctorate Recipients, 1997–2001

- | | |
|------------------------------|--------------------------|
| 1. University of PR Piedras | 9. University of Florida |
| 2. University of PR Mayaguez | 10. Cornell University |
| 3. Univ of Texas Austin | 11. Stanford University |
| 4. UC-Berkeley | 12. Univ of TX El Paso |
| 5. MIT | 13. UC-Irvine |
| 6. UCLA | 14. University of Miami |
| 7. Florida International | 15. UC-Davis |
| 8. Texas A&M | |

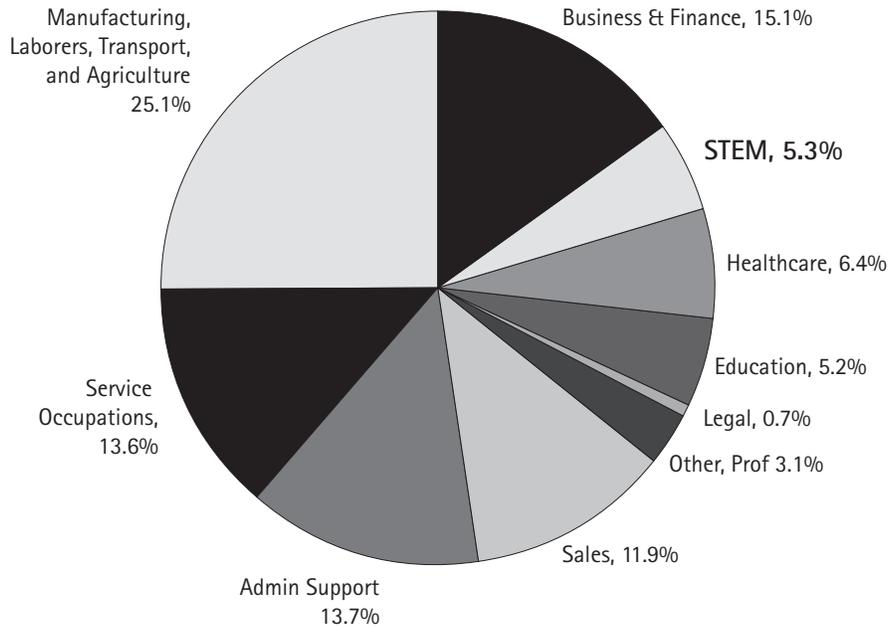
Source: CPST, data derived from NSF Web CASPAR

Comparison of Bioscience Postdocs with All Other S&E Postdocs, 1977–2001 (U.S. Citizens & Permanent Residents only)



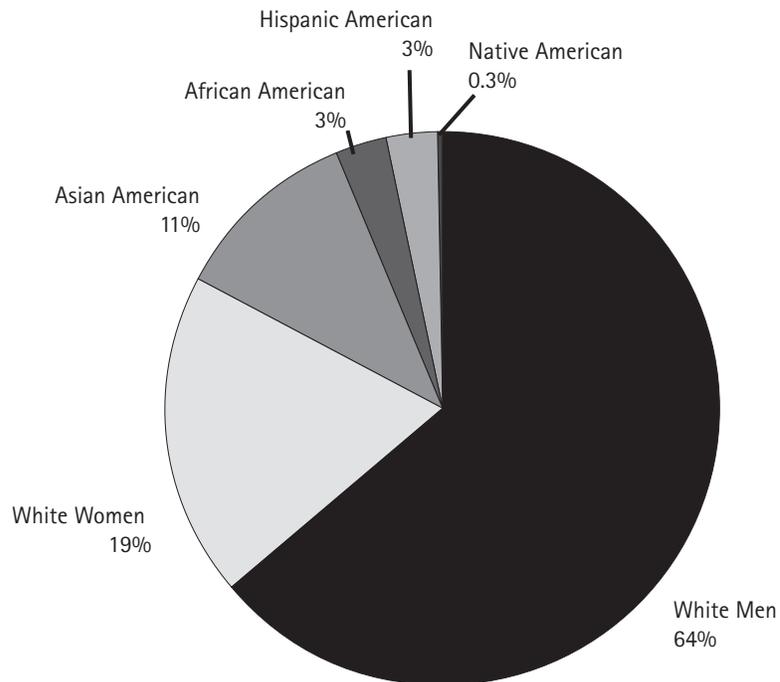
Source: CPST, data derived from NSF, GSS

STEM Workforce as a Percentage of the Total Workforce in the U.S., 2001
 (Total Workforce = 135,073,000)



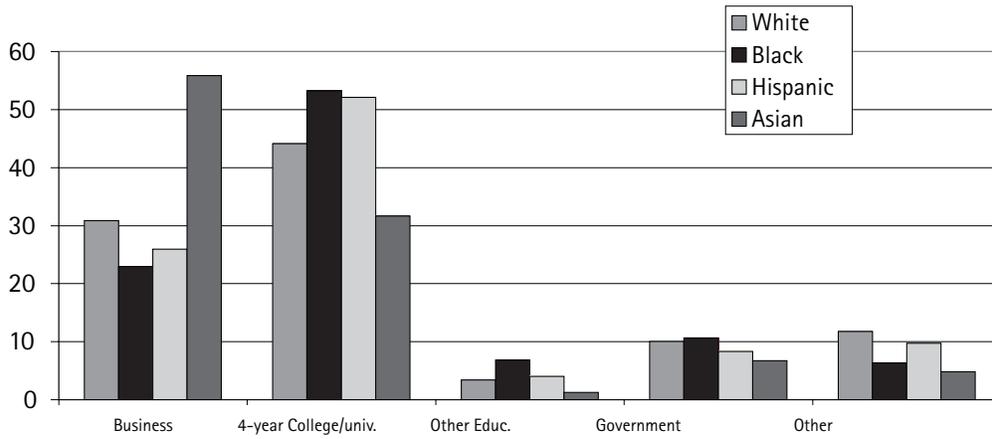
Source: CPST, data derived from Current Population Survey, BLS

Scientists & Engineers in the Labor Force, by Sex and Race/Ethnicity, 1999



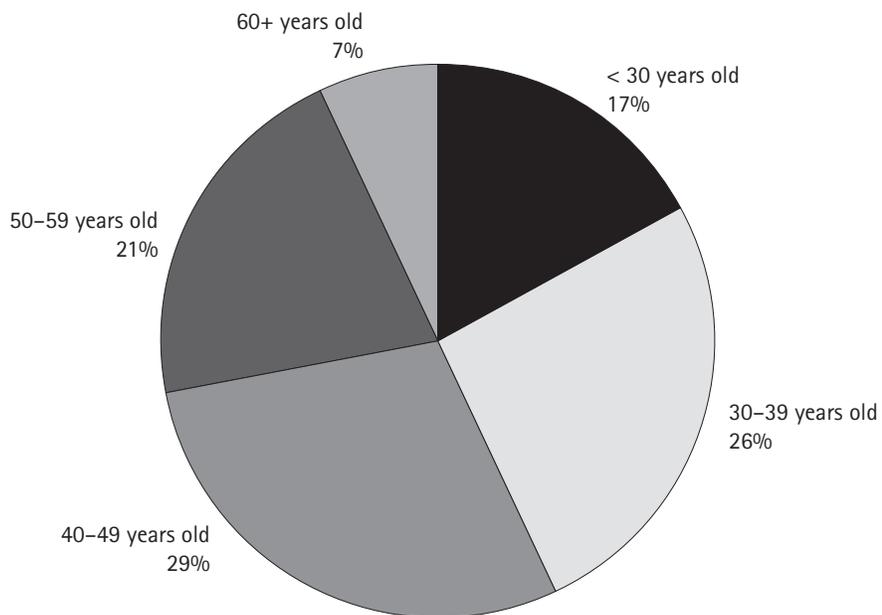
Source: CPST, data derived from NSF SESTAT

Employment Sector of PhD Scientists and Engineers by Race/Ethnicity, 2001



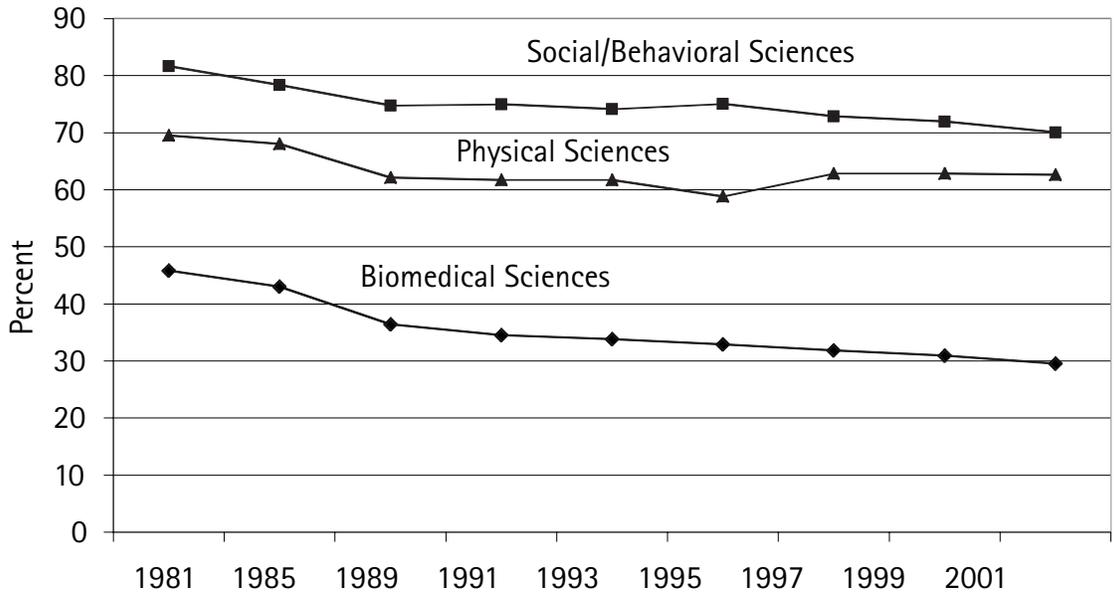
Source: CPST, data derived from National Science Foundation, SESTAT

Employed Scientists and Engineers by Age, 1999



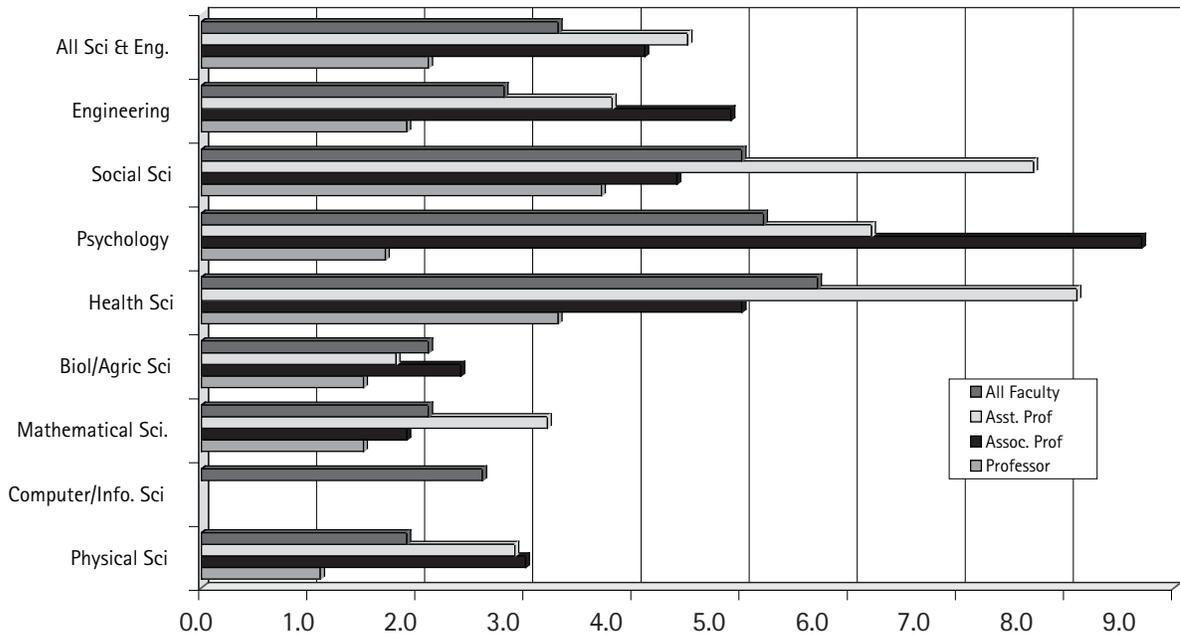
Source: CPST, data derived from NSF SESTAT

Percentage of U.S. PhDs Holding Tenured or Tenure-Track Positions by Field



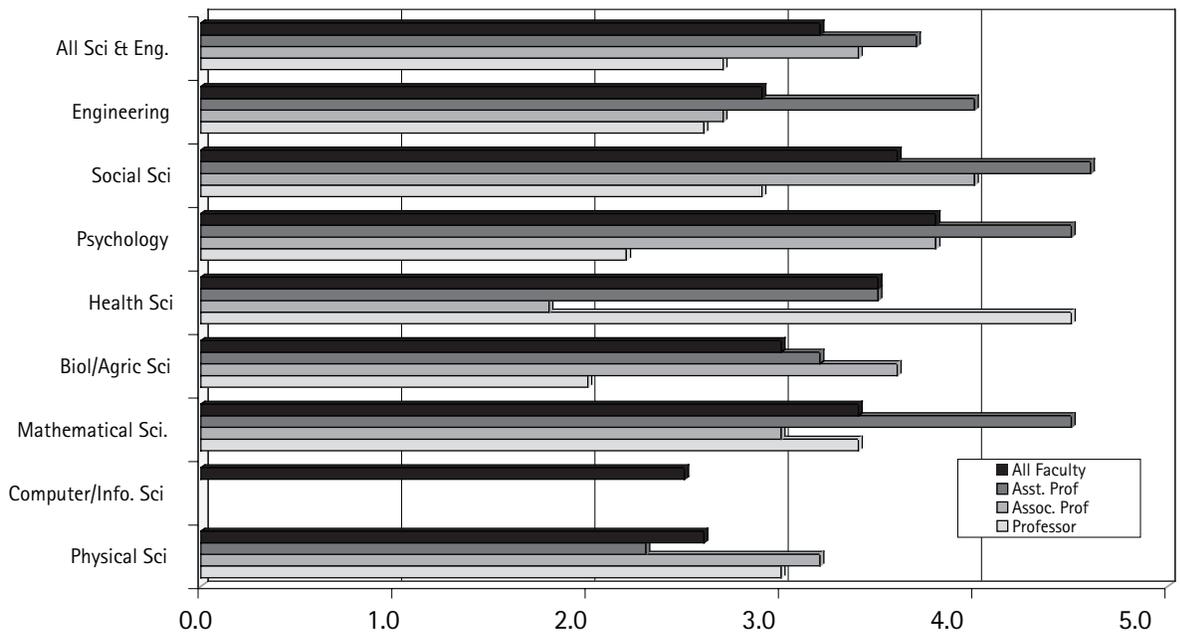
Source: CPST, data derived from NSF, Survey of Doctorate Recipients

Proportion of Blacks Employed in Academe by Field and Rank, 2001



Source: CPST, Data derived from National Science Foundation, SESTAT

Proportion of Hispanics Employed in Academe by Field and Rank, 2001



Source: CPST, Data derived from National Science Foundation, SESTAT

Appendix B: Conference Agenda

Thursday, January 15, 2004 Conference Schedule

- 7:30am–8:30am **Continental Breakfast**
- 8:30am–8:45am **Welcome and Introduction**
Presenters: Alan Leshner, Chief Executive Office, AAAS
Shirley Jackson, AAAS President-Elect and President of Rensselaer Polytechnic Institute
- 8:45am–10:15am **Setting the Stage: The Impact of the Changing Policy Climate on Science, Mathematics and Engineering Diversity**
Presenters:
▶ John Powell, Executive Director, Kirwan Institute for the Study of Race and Ethnicity, Ohio State University
▶ Shirley Malcom, Head, Education and Human Resources Programs, AAAS
▶ Daryl Chubin, Senior Vice President, National Action Council for Minorities in Engineering
- 10:15am–11:45am **The Perspective from the Universities**
Presenter: Charles M. Vest, President, Massachusetts Institute of Technology
Moderator: Larry Rudolph, General Counsel, National Science Foundation
Respondent Panel:
▶ William (Brit) Kirwan, Chancellor, University System of Maryland
▶ Shirley Jackson, President of Rensselaer Polytechnic Institute
- 12:00pm–1:30pm **Lunch**
- 1:45pm–3:15pm **The Perspective from Government Programs**
Presenter: Joseph Bordogna, Deputy Director, National Science Foundation
Moderator: Jamie Keith, Senior Counsel, Massachusetts Institute of Technology
Respondent Panel:
▶ Raynard Kington, Director, Office of Behavioral and Social Science Research, National Institutes of Health
▶ Peter Faletta, Program Director for Workforce Diversity, Office of Science, Department of Energy
- 3:30pm–4:30pm **The Perspective from Industry**
Moderator: John Yochelson, President, BEST Building Engineerin and Science Talent
Panel:
▶ Wayne C. Johnson, Executive Director, University Relations Worldwide, Hewlett-Packard Company
▶ Angela Knight, Director, Diversity, Staffing and Outreach, Merck
▶ Cathleen Barton, U.S. Education Manager, Intel Corporation

4:30pm–5:15pm **Sorting and Synthesizing Perspectives: Themes for Thursday’s Workshop Sessions**

Presenter: Lynn Walker Huntley, President, Southern Education Foundation

5:15pm–7:00pm **Reception**

Note: By day’s end we need an estimate of how many are planning to attend the workshop

Friday, January 16, 2004 Workshop Schedule

8:30am **Continental Breakfast**

9:00am–9:30am **Welcome and Workshop Organization**

A facilitator will be assigned in advance to each breakout. Number and focus of breakouts may be adjusted depending on what emerges from the Conference and interest in each Workshop

9:30am–12:00pm **Workshops meet in Breakout Rooms** (*proposed themes*)

- ▶ Collaboration
- ▶ Program Guidelines
- ▶ Research/Building the Case
- ▶ K-12 Outreach
- ▶ Financial Targeting
- ▶ Graduate and Professional School Admissions
- ▶ Faculty Recruitment and Hiring and Institutional Transformation

Breakout Group Leaders

- ▶ Sue Rosser, Dean of the Ivan Allen College, Georgia Institute of Technology
- ▶ Karl Pister, Chancellor Emeritus, University of California at Santa Cruz and Chair of the National Academy of Engineering’s Committee on Diversity in the Engineering Workforce
- ▶ Jim Stith, Director of Physics Programs, American Institute of Physics
- ▶ Claiborne Smith, President, Delaware Foundation for Science and Mathematics Education
- ▶ Robert Redwine, Dean for Undergraduate Education, Massachusetts Institute of Technology
- ▶ Orlando Taylor, Vice Provost and Dean of the Graduate School, Howard University
- ▶ Marilyn Suiter, Program Officer, Education and Human Resources, National Science Foundation

12:00pm–1:00pm **Working Lunch in Breakout Rooms**

1:00pm–3:00pm **Reports from the Breakouts**

3:00pm–3:30pm **Wrap Up**

Appendix B: Setting the Stage — Timeline

Shirley M. Malcom, AAAS

Daryl E. Chubin, NACME

Milestones in Science, Mathematics, & Engineering Participation, 1972 – Present

Pre–1970s	Post-Great Society
1972–79	Pre-Bakke: Targeting/Individuals
1980–87	Pipeline: Program Effectiveness (pre-evaluation)
1988–94	Demographics/Institutions (MSIs)
1995–2003	Accountability: Systemic Change (post-GPRA evaluation)
2004→	Post-Michigan: Post-Affirmative Action?

1972–79

Targeting/Individual Focus

1972	Creation of NIH MBRS/MARC
1973	National data disaggregated by race/ethnicity
1974	NACME founded
1975	AAAS <i>The Double Bind</i>
1976	AAAS <i>Programs in Science for Minorities</i>
1978	Bakke decision
	NSF Minority Graduate Fellowship and RCSE established

1980–87

Pipeline: Program Effectiveness (pre-evaluation)

1980	EEO at NSF/creation of CEOSE (congressional mandate)
1981	Dept of ED Harris Fellowship (terminated in 1997)
1982	NSF <i>Women & Minorities</i> (biennially)
1983	NSB <i>Educating Americans for 21st C</i>
1984	AAAS <i>Equity & Excellence</i>
1986	OTA <i>Demographic Trends and the S&E Workforce</i>

1988–94

Demographics/Institutions

1988	OTA <i>Grade School to Grad School</i>
1989	Task Force on Women & Minorities
1990	AAMC Project 3000 x 2000
1991	AAAS <i>Investing in Human Potential</i>
1991	OTA <i>Federally Funded Research</i>
1993	OSTP/FCCSET <i>Federal Investment in SMET Education</i>
1994	Medical school minority enrollment peak

1995–2003

Systemic Change (post-GPRA evaluation)

1995	Adarand decision <i>AAAS The Changing Climate</i>
1996	Proposition 209 (CA) Hopwood (TX) Presidential Mentoring Awards (annual)
1998	<i>AAAS Losing Ground</i> NSF Minority Graduate Fellowship discontinued
1999	NSF merit review criteria revised <i>OSTP/NSTC Workforce of the Future</i>
2000	Morella Commission <i>Land of Plenty</i>
2001	BEST created
2003	Michigan decisions

2004.....➤

Post-Michigan: Post Affirmative Action?

- Search for race surrogates
- Access/admissions criteria (% plans, legacies, holistic)
- Institutional leadership/Institution-wide programs (e.g., NSF ADVANCE)
- Cultural competence (class configuration, curriculum)
- Selective institutions re “critical mass”
- Faculty diversity
- State budgets (special impact on 2-yr institutions)
- Mainstreaming programs & targeting (K-12 standards movement; role of minority-focused orgs)
- Globalization & international workforce
- Political will

Appendix B: The Beauty of Diverse Talent

Shirley Ann Jackson, Ph.D.
President, Rensselaer Polytechnic Institute

Good morning. Thank you, Dr. Alan Leshner for that warm introduction, and thank you for asking me to join you.

I would like to begin, this morning, with a preface, which may give an interesting perspective to the deliberations of today and tomorrow.

At the end of December, *The New York Times Magazine* cover story highlighted the prevalence of actors and models whose racial or ethnic identity is “indeterminate.” The article pointed out that the entertainment industry—and now the fashion industry—increasingly are tapping young people of mixed racial and ethnic backgrounds to be actors and models. The practice makes their products appealing both to a full-spectrum domestic market, as well as a diverse global marketplace.

The Times termed this generation of young people “ethnically ambiguous.”

It is tempting to dismiss this as an exploitative trend, and, it well may be exactly that. But I suggest it, also, may introduce a useful perspective.

The 2000 U.S. Census was the first time in which respondents were given the option to check more than a single racial category. Nearly seven million Americans took advantage of that option, identifying themselves as members of more than one race.

Another 14 million people identifying themselves, ethnically, as Latino or Hispanic, ignored the racial boxes for “black” or “white,” and selected the category marked “some other race.”

One magazine editor, interviewed in the article,

commented that “beauty transcends race or class” and, also, that this trend “represents the new reality of America.”

This is telling.

Of course, not only does beauty transcend race and class, but, as we all know, so does talent. For *The Times* to focus on this trend strongly signals that diversity has become of value—worth trading on. It is also, as the editor stated, the “new reality of America,” and “represents the changing face of America”—what I have been calling, for some time now, when women are included, the nation’s “new majority.”

I believe that it is useful, during our deliberations, for us to keep in mind this demonstration of the value (albeit in a commercial context) of diversity. For after all, the reality is that commerce often drives change in America.

Our culture traditionally has focused on differences. The trend toward the “ethnically ambiguous” essentially makes differences either meaningless—or, more appropriately, enriching and valuable. With the change in the demographics of our country, is this not also our future? And, does it not make clear the imperative of educating all of our children? Which is something we have been preaching, all along. I believe this may give us a useful context, a different perspective, as we deliberate the impact of the recent Supreme Court rulings.

I am encouraged by the spectrum of entities which are participating in these deliberations. The perspectives of industry, government, higher education, and

the legal view, I believe, will give us a valuable synthesis of ideas. Examining the many facets of a complexity, as scientists will confirm, is, of course, the way to see it most clearly and effectively. And, the more clearly we see, the clearer will be our course for action. And, I believe that is why all of us are here—to mark out appropriate action steps.

Similarly, it will take the involvement of all these elements to bring about the changes which we know must take place within our educational system to sharpen its effectiveness. Indeed, it has been an ethos of fragmentation which has failed us, and has kept us from mining the talent available from the full spectrum of young people. I will return to this theme.

Let it suffice to say, for the moment, that to encourage underrepresented groups to study science, and engineering, and to seek careers in these disciplines, now will occur in a somewhat altered environment, as represented by last year's U.S. Supreme Court rulings in the University of Michigan admissions cases. And, the recent U.S. Supreme Court decisions risk obscuring some of the larger issues.

As the title of this conference—"Next Steps, Next Decade"—implies, affirmative action has been a focus of national debate for many years. Yet, we know that the matter encompasses more than generally is acknowledged when discussion focuses on a specific population segment, and on a specific institution. The issue exceeds the relatively limited question of who gets to enter the college classroom. It extends to the larger question of how we can prepare and educate our entire talent pool, so that all of our children are prepared for higher education, for advanced degrees, and for entry into the science and engineering workplace.

This is the real challenge.

The demographics of the nation have changed. African Americans and Hispanics now account for about a quarter of the total U.S. population. Add to that another population segment—women—comprising more than half of our people. Then, groups underrepresented in the science, engineering, and technical disciplines—are now a majority—what I call the "new majority"—comprising nearly two-thirds of the entire U.S. workforce.

There has been other change. For many years, we have relied upon—and welcomed and benefited

from—the infusing of talent from abroad, in our colleges and universities, and in our corporate and government laboratories. During the decade of the 1990s, the percentage of foreign-born scientists and engineers in the United States leaped from 24 percent to 38 percent.

With security measures in place since September 11th, however, that source of talent has been curtailed. A study by the National Science Board found that from 2001 to 2002 the number of temporary worker visas issued for jobs in science and technology plunged from 166,000 to 74,000—a decline of 55 percent. Similarly, successful visa applications fell from 10 million to 6.5 million. Aside from visa issues, many of the talented scientists and engineers are choosing to study elsewhere in the world, or, are choosing to remain at home—because, increasingly, they can.

What does this mean for American innovation? How will it affect our nation and our future? What do we need to be doing?

Quiet Crisis

As those of us here well know, and take for granted, our nation's prosperity, our quality of life, the very security of our nation relies, in large measure, on the driving forces of scientific and technological discovery and innovation. These national benefits are a direct result of our deep technology base, highly productive workforce, strong research and development capacity, and robust competitive spirit.

This national capacity has given us an economic engine powered by innovations and discoveries in science, engineering, and technology. It has brought us a quality of life and a global primacy many take for granted.

This national capacity rests largely on the work of a small segment—scientists and engineers comprise a mere 5 percent of our total workforce.

This small, but critical segment of our workforce is aging. About half of U.S. science and engineering workers are over 40 years old.

It is only logical to assume that retirements among science and engineering workers will increase dramatically over the next two decades. The segment, today, is overwhelmingly white and male.

To replace them when they leave, we must look to the millennium generation of young people, which, as demographics now dictate, comprise the “new majority.”

The impending retirements are compounded at the entrance end. Graduate and undergraduate student populations in engineering and the physical sciences—and even in the computer sciences—are static or declining. The only positive trajectories have been in the life sciences.

This is echoed in the annual *Survey of Earned Doctorates for 2002*, which found that the number of doctorates earned—fewer than 40,000—is at the lowest point in a decade, down about 6 percent over the last five years. It found, too, that the number of doctorates in the physical sciences and engineering has fallen substantially since 1997, with doctorates in the physical sciences down 14 percent and in engineering down 17 percent. Doctorates in the life sciences have risen slightly. The National Science Board study found that 17 percent of workers with bachelor’s degrees in science or engineering were from a foreign country.

The study also revealed that while women earned more doctorates than men for the first time, this is not because more women are earning Ph.D.s, but, rather, because the number of degrees awarded to men has dropped by nearly 15 percent since 1997.

While the United States is experiencing challenges to its production of science and engineering professionals, other nations increasingly are committed to national capacity—i.e. investing, especially, in human capacity—and it has been paying off. A \$250 million World Bank loan to India is helping to revamp engineering colleges and technological universities, where more than 100,000 students study. The money is modernizing facilities, upgrading curricula, and training faculty members.

Collectively, China, India, Japan, South Korea, and Taiwan have more than doubled their production of bachelor’s degrees in the natural sciences since 1975, and quadrupled the number of bachelor’s degrees in engineering.

As nations are investing in higher education at home, they also are creating global industries in focused technological areas. Taiwan, Korea, Ireland, Israel, and India are emerging in the pivotal informa-

tion sector. Scandinavian countries are comparatively strong in telecommunications. Japan and China are investing heavily in science and technology. And, of course, American corporations, experiencing economic pressure to cut costs and to build global networks, are moving a spectrum of jobs overseas.

It becomes clear that U.S. global primacy is being pressured from the outside by the building competition among both developed and developing nations. From the inside, we are experiencing pressure to replace the graying science and engineering workforce with new talent—educated young scientists and engineers who will make the discoveries and innovations which have paid off so handsomely, to date. This has been called, “The Quiet Crisis.”

Yesterday’s announcement—proposing a new “human exploration” agenda to establish a permanent settlement on the moon, and eventually landing people on Mars, makes a case in point, since 15 percent of NASA scientists and engineers can retire now, and 25 percent of them are eligible to retire within 10 years.

Our nation must galvanize the national commitment, and the national will, to develop and to tap the full spectrum of homegrown talent. With national commitment and will, I believe, we would succeed in finding, nurturing, and developing the talent inherent in our children. We did it before, when the Soviet-launched satellite “Sputnik” orbited earth’s skies, spurring America to action. We can do it again.

While the recent Supreme Court decisions uphold diversity, they force us to come at things in a different way. And, the irony is, we now have constraints on promoting diversity, which force us along a very narrow pathway. At the same time, we have demographic shifts in our population which are going to make some of the usual arguments moot—when the whole population is turning into the underrepresented majority, and, within that, the underrepresented minority comprises a larger percent of the population.

While we are not looking for privilege for the “new few” to replace the privilege of the “old few”, nonetheless, we must come up with solutions for developing science and engineering talent—solutions that address the new and coming realities of the underrepresented minority becoming the underrepresented

majority. Parenthetically, I have to say that it is ironic that two of the groups pitted against each other in the recent Supreme Court rulings, themselves, comprise a significant part of the underrepresented majority.

So, in walking this narrow, legal path, we nonetheless, must be unafraid and must forthrightly develop new solutions. Those new solutions will be based on the creation of a new national will to develop all of our latent talent—a will that must be derived from a cacophony of voices which demand that the new majority be recognized in science and engineering. As the cacophony rises, it demands a resolution of what Federal decisions apparently allow, and what state legislative constraints apparently require—there are some Federal/State oxymorons out there.

It also demands a sharper focus on understanding how to judge talent in its full flowering, which will require more robustness in decision-making about college admissibility, for example. But the fight cannot be at the college classroom door, because it is a false fight. Instead, we have to go back to the beginning to understand what really works in identifying, nurturing, and developing scientific talent. These are the things we must be here to discuss.

We are not starting from scratch, however. There is a basis in the efforts over the years of many groups and individuals, including those gathered in this place. One such example, in which I have been directly involved, is the effort of BEST.

BEST, which stands for Building Engineering and Science Talent, and was formed under the aegis of the Council on Competitiveness with support from the National Science Foundation, has spent three years conducting a comprehensive evaluation of programs that work. They have produced a tri-part study of programs and approaches in pre-K through 12 education, in higher education, and in the work place. No such assessment has been attempted on this scale.

The resulting compilation of effective programs in higher education will be released next month at the AAAS Annual Meeting in Seattle. I served as co-chair of the BEST Blue Ribbon Panel on Higher Education.

The report will detail exemplary programs which can be replicated, transferred, and scaled. The identified “best practices” formed the basis for benchmarks of excellence and, from them, were derived design principles that can be applied nationwide.

What criteria make programs exemplary? The ones selected shared four elements: excellence and equity; evidence of effectiveness over at least a decade; institutionalization and replication; and planning and execution that exceeded expectations.

Ultimately, we need to create a national policy dialogue to build the commitment which is needed to implement these principles. And, ultimately, once we have secured the national will to invest in our children, we will want to animate that national policy with programs what have been proven to succeed.

It takes several decades to “build” a scientist or an engineer. There is no “quick fix.” It is a long-term investment in human resources, and as the nation’s current generation of scientists and engineers continues to age, there is little time to waste in investing in their replacements.

As I said at the outset, I am encouraged by the spectrum of groups participating in this conference. It represents a groundswell of concern, interest, and support for a broadly based dialogue. It also is encouraging because, in spite of the challenges we face, there has been a fragmentation inherent in our efforts and in our system—a failure to link and to engage in a united manner to achieve results.

That we assure continued national capacity in science and engineering—whether to build a human settlement on the moon or to fuel national economy—is an issue of self-interest, an issue of national self-interest, indeed, of national security.

If we engage the talent—with its beauty and the beautiful minds—of all of our young people in science and engineering studies and professions—we will address our national self-interest. And, we will have acknowledged the value inherent in talent and inherent in diversity.

Thank you.

Appendix B: Science, Technology, and America's Future

C. M. Vest, Ph.D.

President, Massachusetts Institute of Technology

Our nation can succeed in the 21st century only through its mind power and technological innovation, not through geographic advantage, inexpensive labor or military might. Innovation is the key to productivity, and therefore to jobs, health, security and quality of life.

Indeed, technological innovation has been responsible for 50 percent of the growth of the U.S. economy during the last sixty years. Technological innovation is driven by basic research.

Today, our universities are our primary source of basic research, because industry now does very little R&D with a long time horizon. Technological progress must be underpinned by such basic research.

And, even more to the point, our universities are also responsible for educating the next generation of scientists, engineers, managers, entrepreneurs, doctors, and leaders.

Indeed, we have a national innovation system—a loosely coupled alliance of universities, industry, and government that create new knowledge and technology through research; educate young men and women to understand and apply it; and use it to create new products, processes, and services and move them into the marketplace.

But the effectiveness of our universities as engines of innovation and prosperity can be maximized only if we engage talent, mind power, and perspective from our diverse citizenry.

How we engage this diverse citizenry in science

and engineering is the question that has brought us together this morning.

I have been asked to share some thought in this regard from the perspective of academia.

The thoughts are my own. They are not very original, but I hope they will be helpful to our deliberations—deliberations that I believe are crucially important.

Why We Need Diversity

Many of us observe and believe that diversity of our student bodies contributes to the richness, relevance, and effectiveness of the education of all college students. This is validated by various studies. But I do not intend to elaborate on that point, as important as it is, because today we should concentrate on our roles and responsibilities regarding the diversity of America's future workforce and leadership in science and engineering.

I would like to state a number of personal observations and views that frame how I think about the matters we are here to discuss today.

1. Our reason for gathering here is because we believe that we have a major and important responsibility to our nation—creating the STEM workforce and leadership of the future, and maintaining U.S leadership in science and engineering in an age in which our ability to have a vibrant economy, be secure, and enjoy good health and quality of life will almost certainly require such leadership.

2. The percentage of U.S. students entering college and university intending to major in science and engineering has been steadily declining for many years.
3. The fraction of those who as freshmen intend to study science or engineering, but who move out of these fields before graduation is also increasing.
4. African American, Hispanic American and Native American students follow all these same trends, but the fractions are substantially worse in each.
5. A diverse technical workforce in American industry is more likely to conceive, design, and develop products, processes, and systems that perform well in the market place formed by the increasingly diverse U.S. population.
6. Non-U.S. citizens now dominate PhD programs in science and engineering.
7. To take a specific example: We are not generating the necessary science and engineering talent and expertise for our defense departments and industry. Much of this work is properly restricted to U.S. citizens, and the government cannot accept many of its components being designed and manufactured in other countries.

In my view, it follows from these and other conditions that we must work hard to inspire and attract more of America's most talented young men and women into these fields, and we must create educational environments that enable them to develop their talents to the fullest. We cannot achieve this goal if we leave women, African Americans, Hispanic Americans, Native Americans, or any other group behind.

Yet in my experience, and in my examination of decades of data, it is an inescapable conclusion that there are real or perceived barriers to attraction to, entrance into, and success in science and engineering that are statistically unique to each of these groups. These barriers to attraction, entrance and success have complex historical, societal, and psychological origins that cannot be denied or ignored, as much as I wish that were not the case.

The history of slavery and race in our country, the disproportionate poverty in these groups, self perception of some members of these groups, societal messages that lower the attractiveness of STEM careers, and, above all, the failures of our K-12 system for many of these students all create a situation in which we find that:

1. Disproportionately fewer minority students are attracted to science and engineering; and
2. On the average, minority students' performance, as measured by graduation rates or grade point averages, are lower than the cohort of Caucasian and Asian American students with identical academic potential, as measured by test scores, grades, etc when they are admitted.

From all of this I conclude that we—government, industry and academia—have a serious problem to solve for our nation.

We must increase the diversity of our future workforce and leadership in science and engineering.

This requires that we increase the attractiveness of STEM careers for young minority students; that we improve their path to entrance into universities, graduate programs, and the professions; and that we create environments that maximize their opportunity to be successful in fully developing their talents and expertise.

Solving the Problem

We have a problem to solve. We have a responsibility to meet. But the context in which we must meet this responsibility and solve this problem is complex, and frankly ill defined.

This context is the subject of intense philosophical, political, and legal debate and formulation. The ground continually shifts.

The rulings in the Michigan Supreme Court cases clarified parts of the context within which we must work. They confirmed that race may be taken into account in college admissions to build broadly diverse student bodies. And they confirmed the discretion of higher education to make academic decisions, including one of our highest academic responsibilities—selecting our students.

But they also raised many more questions than they answered as we think about elements of our solution space beyond the specifics of college admissions policy.

And the debates that preceded the Michigan decision, as well as the continuing political and legal attacks on various affirmative action and diversity-building programs, make our work today all the more important—and all the more difficult.

I am an eternal optimist. So I would like to start with the premise that the vast majority of people believe that a diverse American society is good, and that opportunity for inclusion and success of men and women in fields like science and engineering should be maximized. And that we are just divided in how we think this desirable state should be achieved.

1. Some believe that we can and should simply ignore race as a factor in how we think about, and work toward our solution.
2. Others believe that we cannot ignore race and must explicitly take it into account if we are to solve our problem.

Unfortunately, these views tend to be so strongly, emotionally, and politically held, that dialog is difficult, and common ground is hard to find.

All this is rooted to a large extent in political and philosophical constructs about how to map the interests of individuals against overall needs of society.

These chasms are great, but we can perhaps advance if we at least agree that we have a common goal, and that we must progress to that goal. The beauty —distant as it usually seems —is that if we succeed in solving the problem of full inclusion and success, then we will have arrived at a time in which we all agree that there is equal opportunity and inclusion for all, and we can stop arguing.

Simply put, if we truly level the playing field, the debates would be moot.

My personal views on how we achieve our goals are based on three things—my engineering background; my lifetime in higher education; and my observations of the participation of women in science and engineering.

Engineering Background

I am an engineer. This strongly influences how I approach problems. You formulate them; you attempt an approach to solution; you observe the results; and you improve your solution based on what you observe.

Even more basically, if a problem is to be solved, it must be approached directly, and not encumbered with artificial or unnecessary constraints.

Lifetime in Higher Education

When I began my career as a Teaching Fellow and then as a young assistant professor at the University of Michigan in the 1960s it was extraordinary if I had more than one African American student in my classes every couple of years.

In fact, it was extraordinary if I had more than one or two women students in a class. And if I had either, it was virtually assured that they would be one of the best two or three students in the class, because only through unusual drive and commitment would these students have come to study engineering.

In that context, when I think about MIT's current student body whose undergraduates are 42 percent women, 6 percent African-American, 12 percent Hispanic American, 2 percent Native American, and 28 percent Asian-American—a student body that is remarkably diverse in so many other dimensions as well—it seems to me that a miracle has happened.

But that is just the point. It is not a miracle. It is not a natural occurrence. It is the result of determined, conscientious effort, over more than three decades, often against seemingly insurmountable odds.

I can only conclude that despite the length of the journey, our nation is a better place than it was three decades ago.

It can be better still.

Women in Science and Engineering

As I said, MIT's undergraduate student body is about 42% women. This too is not the result of a miracle. It is the result of concerted effort starting about four decades ago, when that percentage was in the single digits.

How did it come about?

Explicit efforts across many parts of our society, government, industry and academe began to raise our sights that women need not be constrained to pursue only what were thought of as traditional paths. And yes, many women demanded that their rights be recognized, and their opportunities be expanded. Many of you will remember that the debates were nearly as divisive and difficult then as our continuing dialog about race is today.

In terms of engineering and science, many things happened:

1. Companies began to advertise for and aggressively recruit women. They created summer intern programs for women students.
2. Universities formed groups like the Society of Women Engineers.
3. Admissions and recruiting materials were redesigned to appeal to young women as well as young men.
4. In the early years there was explicit preference in admissions.
5. Universities mounted outreach and mentoring programs for girls in junior high school and high school. Corporations frequently funded these programs.
6. The importance of faculty role models and mentors for women was increasingly recognized.
7. NSF and other federal funding agencies created specific programs to encourage young women's participation.

Slowly but surely, undergraduate enrollment of women began to climb. Today, at MIT it seems to be moving asymptotically close to 50%.

These explicit efforts led to significant achievement, and in time, our experience has shown we moved to a point where there is no overall difference in the academic performance of men and women, and their representation in more and more fields, is reasonably in line with their proportion in the population, i.e. 50–50.

I think that there are lessons here that say “Stay the course” if you want to ultimately achieve similar results for minorities.

And why is there a difference? Why, in the same period of time has the progress of women outpaced that of minorities?

It seems to me that this is simply evidence that the barriers are higher for minorities, because of an even deeper historical societal bias, even deeper psychologies about success, even fewer mentors and role models, proportionately more poverty, proportionately more kids in inadequate schools, etc.

The lesson, in my view is still “Stay the course. It works.”

The Higher End of the Pipeline

Every university here today can show a set of enrollment graphs that are qualitatively similar. Plotting enrollments over 30 years or so, these graphs show:

1. Strong growth in the percentage of undergraduate women in science and engineering—nearing their percentage in the population.
2. Good growth in the percentage of minority undergraduates in science and engineering—but still significantly below their representation in the population.
3. Much more modest growth in the percentage of women in doctoral programs in science and engineering—less than half of their representation in the undergraduate population.
4. Extremely small growth in the percentage of minorities in doctoral programs in science and engineering—miniscule in proportion to their representation in the undergraduate population.
5. Substantial growth in the percentage of women in the faculties of science and engineering—but far below their proportion in either the undergraduate or doctoral student populations.
6. Very little growth in the percentage of minorities in the faculties of science and engineering—but far below their proportion in either the undergraduate or the already small doctoral student populations.

I cite these facts to emphasize that even as we progress with building diversity and success at the undergraduate level, deep problems remain. Improvement in undergraduate enrollment simply does not rapidly diffuse into graduate programs and then into our faculties.

Similarly, careers in government and industry that lead to full inclusion and technical leadership require that we work hard and overtly to improve our graduate populations and make faculty careers viable and attractive.

We all know the metaphorical pipeline.

There is no question that the worst, most leaky part of this pipeline is in the K-12 system.

But we are directly responsible for the higher end of that pipeline, and I believe that we need to work hard on our own responsibilities. We cannot blame everything on the segments of the pipeline below us.

Race is a Factor

As I noted earlier, a kind interpretation of the public debate suggests that some believe that we can and should simply ignore race as a factor in how we think about, and work toward our solution.

Others believe that we cannot ignore race and must explicitly take it into account if we are to solve our problem.

Whether we are considering college admission, outreach to youth, fostering of diversity in our graduate programs, or just generally considering why students do or do not seek careers in science and engineering, I personally come to the conclusion that race is a factor. It cannot be ignored or wished away.

I see no evidence that proxies such as economic status explain away the influence of race. If one examines *The Shape of the River*, or similar studies, it appears that factors such as economic status attenuate the apparent effect of race in areas such as academic performance, but they do not erase it.

Let's consider academic performance and address an unpleasant reality. By academic performance I mean things such as graduation rate or grade point average. Every study of which I am aware, covering a variety of kinds of institutions show that there is a persistent statistical difference in the performance of underrepresented minority students relative to white or Asian students with statistically identical academic potential. That is, the average performance of the underrepresented minority cohorts is lower than would be predicted by standard test scores and performance in high school.

But if one looks deeper, one finds that the performance gap for minority women, while it exists, is far less pronounced than for minority males. Statistically speaking, these women went to the same schools, grew up in the same homes, had the same economic status as the men, but the average performance vs. the usual predictors is different. This does not seem to be the case for white or Asian students. To me, this indicates that we have a complex web of social and cultural factors involving race that cannot be wished away.

A Solution Framework

A question posed for this session by its organizers is:

If pre-college and undergraduate targeted programs are at risk, then is a “raising all boats” strategy likely to achieve academic goals?

This gets to the heart of the matter.

I believe that across most of American academia in the last two decades, generally speaking all boats have been raised. Imperfect though we may be, there has been a broad effort to improve the quality of teaching, learning and campus life in our public and private universities. A lot of innovation has gone into classroom and laboratory teaching, mentoring has been increased, the quality of facilities has gone up, investments in information technology have increased access to information and learning tools, and student support services have generally been improved.

All of these things properly enhance the environment for and chances of success of all students, regardless of race or any other characteristic.

But to the best of my knowledge, they have not erased statistical performance problems associated with race or removed the appropriateness of treating race as one of many factors in admissions.

It seems to me that we should simultaneously raise all boats and target specific services or support to groups who have a defined or observed need, including racial minorities.

The modest gains that have been made in the last couple of decades, especially in graduate enrollments and faculty appointments are fragile. In my experience they are largely driven by specific outreach and constant attention to seek out, inspire and support the best minority students. I have observed nothing in my career that suggests to me that eliminating targeted efforts will produce anything other than a reversal of gains.

We—academia, industry, and federal agencies -- have been called together today to think about how we continue to make progress toward the important national goal of an inclusive, diverse society—specifically in our own important, future-oriented fields of science and engineering.

Admissions

We were called together because one of the most important and divisive debates in public policy, politics and the law during the last several years has had to do with affirmative action in college and professional school admissions. The Supreme Court last spring made a very strong statement in this regard when it rendered its decision in two suits brought against the University of Michigan.

Our organizers posed this question: How do the Supreme Court decisions embolden or dilute current efforts?

Not wanting to practice law without a license, I will not attempt to directly answer that question. But I will tell you that from my perspective, it was a clear endorsement of the admissions practices at my institution, and that it gave me hope that when push comes to shove, our great nation usually manages to find a path grounded in principle, fairness and common sense.

Indeed, it reminds me of Winston Churchill's famous statement that the United States always does the right thing—after exhausting all the other possibilities.

So on the admissions front, I think we should indeed be emboldened to continue to pursue sound, fair admissions policies in which race is one of many factors that we consider when we make the complicated subjective judgments by which we select our entering classes from the portion of our applicants who are highly qualified by the standard measures to attend our institutions.

But other areas of academic activities find themselves in ambiguous and unclear political and legal environments. Let me speak specifically to programs of outreach to high school students.

Attracting and Inspiring

MIT, during the last three decades, has been a leader in promoting opportunity in science and engineering by reaching out to talented minority high school students. And more broadly, across U.S. universities it was engineering schools that tended to lead the way. In the early 1970s we established outreach and enrichment programs like MITE2S [Minorities In Technology, Engineering and Science] to attract young

Hispanic-American, African-American, and Native-American high school students to the engineering profession—a career that tended not to benefit from a high degree of awareness in their communities.

I don't believe that we saw this task as one of political orientation or ideology. We saw it as an important duty to the nation. We saw it as a problem to be solved—a design to be improved. It flowed naturally from our connection to industry. And private industry—U.S. corporations—provided, and continues to provide, much of the financial support and summer experiences that make these programs work.

Corporations have not supported these programs because they are liberals or conservatives, Democrats or Republicans. They support them because they understand the world is racially diverse. And if they are to understand their customers, produce well-designed, relevant products, and market them effectively, they need the perspectives and experiences of a diverse workforce and leadership.

But we also must contend with today's legal landscape.

During the last two years, we at MIT have learned this the hard way.

A complaint filed against us led to a review of two MIT pre-college summer programs by the U.S. Department of Education's Office of Civil Rights. The two highly valued programs are MITE2S and Project Interphase.

MITE2S provides intense education and career inspiration for high school juniors interested in science, mathematics, and engineering. Interphase is a bridge program for incoming MIT freshmen.

For most of the last three decades, these programs served under-represented minorities, inspiring them to study science and engineering and supporting their success in school and their pursuit of science and engineering careers.

We at MIT are very proud of the decades of accomplishment of these two programs. They have served over a thousand promising young men and women very well.

We pledge to you that they will continue to serve promising minority students in the future.

But, our rigorous examination, and the best advice of every legal expert we sought out, was unequivocal—and led us to conclude that we should not con-

tinue to limit participation in these programs exclusively to underrepresented minority students.

Therefore, we have broadened the selection criteria to include other students whose backgrounds may otherwise stand in the way of their studying science and engineering, and who can support the goals of the programs. And as we do so, we will find ways to continue to meet the underlying goal of fostering the education and opportunities of as many bright underrepresented minority students as possible. I am confident that with the help of our faculty and students, we will continue to exercise the leadership and build the programs that will do just that. And we will be as proud of these programs in the future as we are today.

But the fact remains that it is very distasteful to be pushed by the government to modify programs that have served our nation and our institution admirably for many years. These programs have created inspiration and opportunity for young people of color. They have not destroyed opportunity for any one else.

My fear, and presumably the objective of some others, is that over time, such defocusing and diffusion of effort will wear down the gains that universities, industry, and government have worked together for many years to establish.

So herein lie the dilemma and the confused environment in which we operate. We are expected by our society, and indeed by the federal government, to advance diversity and opportunity in science and engineering. We are given mandates by funding agencies to include outreach to minorities, women, and people with disabilities in our plans for various research programs and centers, and we are expected to produce results.

But at the same time, we are warned that targeting such efforts to the specific populations we are supposed to advance—in ways that we know work—may not be acceptable under currently extant interpretations of the law.

Our community is confused, troubled, and frustrated.

Yet our experience tells us that the inroads made by underrepresented minorities into higher education and careers in science and engineering are fragile, and have resulted from deliberate, concerted attention and actions. We must work together to determine the pathways by which we can continue the journey to a

diverse, inclusive, and excellent workforce and leadership in science and engineering.

This is our duty to the nation.

I am very grateful to all of you for coming together today to begin the work of clearing and clarifying these pathways, so that we can get on with a terribly important job.

In due course an aggressive but sustainable legal position must be forged that does not undermine the goals and accomplishments of our programs to increase the representation of minorities and women in our science and engineering student bodies and industry.

I have no expertise to bring to bear on the legal arguments. But I have tried this morning to share some observations and experiences that may be helpful in understanding what does and doesn't work, and to stand with you in reinforcing the importance of our goal. The law is a framework that evolves over time, and that enables us to work together for the common good. But at the end of the day, the law should serve our nation's highest purposes. And in my view that includes opening and encouraging careers and opportunities for success in science and engineering to the great, diverse population of America. To do less is to put our collective future at severe risk.

Thank you.

Appendix C: Background Readings

1. *The Effect of Changing Policy Climate on Science, Mathematics, and Engineering Diversity* edited by Shirley M. Malcom, Yolanda S. George, Virginia V. Van Horn. Washington DC, AAAS.
Web: http://ehrweb.aaas.org/mge/Reports/Report1/Science_Math_Engr_Diversity.pdf
2. *The Long Road to Race Blindness* by Thomas J. Kane *Science* Vol 32, October 24, 2003.
Web: <http://www.sciencemag.org/cgi/reprint/302/5645/571.pdf>
3. *College Board Seminars on the Implications of the U.S. Supreme Court Decisions in the University of Michigan Admissions Cases*. Summer 2003.
Web: http://www.collegeboard.com/prod_downloads/highered/ad/diversity_summary.pdf
4. *Debating the Benefits of Affirmative Action* by Peter Schmidt. *The Chronicle of Higher Education*, May 18, 2001,
Web: <http://chronicle.com/prm/weekly/v47/i36/36a02501.htm> [subscription required]
5. *Minorities, Women Gain Professionally* by D'Vera Cohn and Sarah Cohen, available in the December 30, 2003 edition of *The Washington Post*.
Web: <http://www.washingtonpost.com>
6. *In Pursuit of a Diverse Science, Technology, Engineering and Mathematics Workforce: Recommended Research Priorities to Enhance Participation by Underrepresented Minorities*. Produced by Yolanda S. George, David S. Neale, Virginia Van Horne, & Shirley Malcolm. Washington DC: AAAS, 2001.
Web: http://ehrweb.aaas.org/mge/Reports/Report1/AGEP/AGEP_report.pdf
7. *Civil-Rights Group Criticizes White House as Lacking in Response to Rulings on Affirmative Action* by Peter Schmidt, *The Chronicle of Higher Education*
Web: <http://chronicle.com/prm/weekly/v50/i17/17a02703.htm> [Subscription required]
8. *10 Questions College Officials Should Ask About Diversity* by Robert Shireman, *The Chronicle of Higher Education*, August 15, 2003.
Web: <http://chronicle.com/weekly/v49/i49/49b01001.htm> [Subscription required]
9. *Are Landmark Court Decisions All That Important?* by Michael Klarman, *The Chronicle of Higher Education*, August 8, 2003.
Web: <http://chronicle.com/weekly/v49/i48/48b01001.htm> [Subscription required]
10. *The Court's Pronouncements Are More Dramatic and Subtle Than the Headlines* by Martin Michaelson, *The Chronicle of Higher Education*, July 18, 2003.
Web: <http://chronicle.com/weekly/v49/i45/45b01102.htm> [Subscription required]

11. *Closing the Nagging Gap in Minority Achievement* by Derek Bok, *The Chronicle of Higher Education*, October 24, 2003.
Web: <http://chronicle.com/weekly/v50/i09/09b02001.htm> [Subscription required]
12. *Affirmative Action Remains a Minefield, Mostly Unmapped: Supreme Court Rulings Confuse Colleges and May Imperil Scholarships Based on Race* by Peter Schmidt, *The Chronicle of Higher Education*, October 24, 2003.
Web: <http://chronicle.com/prm/weekly/v50/i09/09a02201.htm> (subscription required)
13. *NACME-GEM Data Book: A Resource for Engineering Collaborations: Preparing Technology Talent for the Economic Turnaround*. [PowerPoint Presentation, 382 KB]
14. *Affirmative Action and the Future of U.S. Higher Education: A Collection of Remarks*, Delivered at the NACME-GEM Conference, May 29, 2003, Houston, Texas, Edited by Daryl E. Chubin [PDF, 68K]

POLICY FORUM

EDUCATION

The Long Road to Race-Blindness

Thomas J. Kane

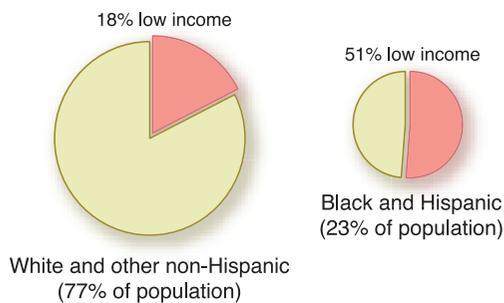
In June of 2003, a majority of the U.S. Supreme Court ruled that the University of Michigan Law School could consider an applicant's race in making admission decisions (1, 2). The court's decision was driven largely by the fact that, given the current distribution of academic performance among U.S. high school seniors, selective universities would admit very few African American or Latino children without taking race or ethnicity into account. The decision was tailored to accommodate universities' use of race in admission decisions, while limiting the impact outside of higher education. In this Policy Forum, I describe empirical realities underlying the debate and issues likely to arise in future legal challenges.

The Trade-Off

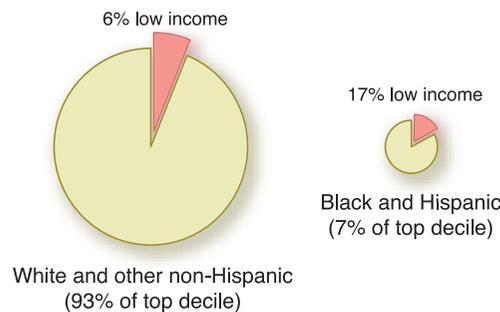
The debate over the use of race in admission decisions has been wrenching, because it demands a trade-off among three worthwhile goals: race-blindness, academic selectivity, and a semblance of racial diversity on selective campuses. A few justices did not find the trade-off sufficiently compelling to outweigh the equal protection clause in the Fourteenth Amendment. Rather than requiring an institution to reduce the number of African American and Latino students admitted, Justices C. Thomas and A. Scalia pointed out that a university could also reduce its academic selectivity to accommodate a race-neutral policy. Justice Thomas asked, if operating a public university law school is such a compelling state interest, why do a number of states including Alaska, Delaware, Massachusetts, New Hampshire, and Rhode Island—choose not to do so? Moreover, he noted, even fewer states choose to operate highly selective public law schools. Such concerns notwithstanding, a majority of the court found the public benefits generated by race-

The author is at the School of Public Policy and Social Research and Department of Economics, UCLA, Los Angeles, CA 90095-1656, USA. E-mail: kane@spssr.ucla.edu

Graduates of the high school class of 1992



Students with test scores in top 10 decile



conscious policies sufficiently compelling to allow continued use of race in admissions.

Basing Admission on Class Rank

In what seems to have been a risky legal argument, the Bush Administration tried to deny the existence of the trade-off itself, arguing that even highly selective institutions could achieve racial diversity by race-neutral means, simply by granting automatic admission to students in the top of their high school class (3). They pointed to the experience of Texas, Florida, and California, which have substituted admissions based on high school class rank for race-conscious policies (although the extent of their success has been disputed) (4-6), as evidence that there are workable alternatives.

But such policies rely on segregated schools, and not all states have highly segregated school systems. In 25 of the 48 states for which data were available, fewer than 10% of African American seniors attended high schools containing more than 90% African American or Latino youth. Latino students are typically less segregat-

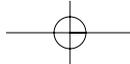
ed: In 37 of 48 states, fewer than 10% of Latino youth attended high schools with more than 90% African American or Latino enrollment. Perhaps not surprisingly, the states that have substituted rank-based policies for race-conscious admissions—California, Texas, and Florida—are among the handful of states that have large numbers of both African American and Latino youth attending segregated schools (7, 8).

Basing Admission on Low-Income Status

As another way to avoid the trade-off between race-blind policies and student diversity, some have suggested race-neutral "class-based" admission policies—targeted at low-income and disadvantaged youth (9-11). But, however worthwhile such policies may be, they will do little to produce racial diversity on selective college campuses. In 1992, among the high-scoring high school seniors (those with test scores in the top tenth of the class), black and Hispanic youth were three times as likely to be from families with incomes less than \$20,000 than white and other non-Hispanic youth (12) (see figure, left). However, black and Latino youth still represented only one out of six high-scoring, low-income youth—17%. Because black and Hispanic youth represented only 7% of the top decile of test-takers, they represented a minority of most subgroups of applicants, even low-income applicants. As a result, selective colleges and universities would have to admit six times as many students under an income-based policy to yield the same number of black and Hispanic youth as would result from an explicitly race-based policy. Preferences based on economic disadvantage offer a very indirect means for achieving racial diversity (12, 13).

Process Matters

In a separate case involving undergraduate admissions at the University of Michigan, the court ruled that the college's mechanical point system, which granted a prespecified number of points on the basis of race, was not legitimate (14). In other words, although universities can consider race as part of a complete reading of an applicant's file, it cannot grant an automatic, prespecified number of points based on race. The distinction is somewhat elusive. The justices were clearly hoping that a more careful reading of each file would lead universities to consider a wider range of each individual's skills and to tailor the weights



given to each characteristic for each individual. However, the decision provides no clear description of the factors universities must consider, the weights they can attach to them, nor how courts should determine whether institutions are indeed tailoring their decisions to individual files.

The inflexibility of the undergraduate point system led a majority of the court to rule against it. However, one strength of that system, emphasized by Justices R. B. Ginsburg and D. H. Souter, was its transparency. When a university's admission policy consists of the aggregation of subjective decisions, it is much more difficult to know precisely what the policy is and whether it passes the constitutional test.

The Concept of "Critical Mass"

In its previous decisions, the court had prohibited the use of race simply for the purpose of racial balancing (15–17). In *Grutter v. Bollinger*, the court recognized the special pedagogical role of higher education institutions and allowed universities to use race when pursuing "the educational benefits that flow from a diverse student body." The primary beneficiaries are not supposed to be the minority students alone, but the whole class (18).

Under such a rationale, the challenge is to define how much diversity is "enough" to produce the educational benefits universities seek. The University of Michigan argued that to fully reap the pedagogical benefits of diversity, they needed a sufficient number of students from each group, to ensure that students felt comfortable expressing themselves honestly to their classmates. This concept of "critical mass" is understandably nebulous. To spell out a specific percentage would have invited charges that it was a surreptitious quota. However, the concept of critical mass will need to be clarified further to withstand future challenges. For instance, between 1995 and 2000, the University of Michigan Law School admitted a class that was 8, 4, and 1% African American, Hispanic, and Native American, respectively. If each of these groups constituted a critical mass, it is not clear why the critical mass required for African American youth was so much larger than the critical mass required for Latino or Native American youth. The question is important, because the university would have been able to achieve 1% African American and Latino enrollment without considering race.

The Handicapped Parking Analogy

As complicated as the legal issues may be, the political issues surrounding race-conscious admission policies are even more treacherous. Handicapped parking provides a useful analogy (12). Suppose that

there were one parking space reserved for disabled drivers in front of a popular restaurant. Eliminating the reserved space would have only a minuscule effect on the parking options for nondisabled drivers. But the sight of the open space may frustrate many passing nondisabled motorists looking for someplace to park.

With the uncertainties surrounding university admissions, it is difficult to identify which individuals are paying the cost of race-conscious admissions (12, 19). In the Spring of 2003, Harvard College accepted only one applicant in 10 (20). Many of the rejected applicants (and, potentially, many more of those who did not bother applying) have better grades and SAT scores than many of the minority applicants who are admitted. A large fraction of these may well believe that they would have been accepted if Harvard had no racial preferences. Yet only about 18% of Harvard's undergraduates are black or Hispanic. Even in the unlikely scenario that ending racial preferences forced all these students to surrender their seats to white and Asian-American students, acceptance rates for the remaining students would only increase from 10 to 12%. If more than 2% of those who were originally denied admission believe that they were the "next in line" and that they would have been admitted in the absence of racial preferences, then the perceived costs will overstate the true costs.

Ironically, the more informal use of race used by the University of Michigan Law School could exacerbate such misperceptions. With a mechanical, point-based system, those who are harmed by race-based policies are more readily identifiable. In the less explicit system endorsed by the court, the perceived costs may be less intense, but more widespread, since it would be more unclear who was the next person in line.

Is 25 Years Likely to Be Long Enough?

Although not imposing an explicit time-limit, the majority in *Grutter v. Bollinger* expressed an aspiration that "25 years from now, the use of racial preferences will no longer be necessary to further the interest approved today." Given the legal rationale they used for endorsing race-based decisions, the court's desire for a deadline is somewhat puzzling. Deadlines are traditionally sought in discrimination cases, when the victims of past discrimination are no longer available to receive the remedy. But when racial considerations are based on the pedagogical value of diversity, a deadline makes less sense.

Is 25 years a realistic goal for closing the racial gap in test scores? The justices seem to have chosen the 25-year time period for no good reason other than that it has been 25

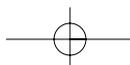
POLICY FORUM

years since they last took up the issue (15). In 1978, the gap in math scores between African American and white 13-year-olds on the National Assessment of Educational Progress was about 1.1 standard deviations (21). By 1986, the gap had shrunk to about 0.6 standard deviations. However, by 1999, the gap in mean scores by race had expanded to about 0.8 standard deviations. The reversal of progress makes the court's 25-year goal look overoptimistic, although recent progress achieved in a few states provides hints that more rapid progress may be possible.

The federal No Child Left Behind Act is designed to encourage all states to close the racial gap in performance. Whether or not efforts to close the racial gap will succeed remains to be seen. However, school districts around the country have no time to spare. Those who will be applying to college 25 years from now will be entering school in 12 years.

References and Notes

1. Throughout this discussion, I use the term race to reflect the way students identify themselves in surveys and college applications.
2. *Grutter v. Bollinger*, 123 S. Ct. 2325 (2003).
3. Amicus curiae brief for the United States at 17–18, *Grutter v. Bollinger*, 123 S. Ct. 2325 (2003) (No. 02-241).
4. M. Tienda et al. "Closing the gap?: Admissions and enrollments at the Texas public flagships before and after affirmative action" (Princeton Univ., Princeton, NJ, January 2003).
5. U.S. Commission on Civil Rights, "The U.S. Department of Education's 'Race-neutral alternatives in postsecondary education: Innovative approaches to diversity' Are they viable substitutes for affirmative action?" (May 2003).
6. Amicus curiae brief of the authors of the Texas Top Ten Percent Plan, *Gratz v. Bollinger*, 123 S. Ct. 2411 (2003) (No. 02-516).
7. C. L. Horn, S. M. Flores, "Percent plans in college admissions: A comparative analysis of three states' experiences" (Harvard Civil Rights Project, Cambridge, MA, February 2003).
8. Amici curiae brief of social scientists G. C. Loury, N. Glazer, J. F. Kain, T. J. Kane, D. Massey, M. Tienda, B. Bucks, *Grutter v. Bollinger*, 123 S. Ct. 2325 (2003) (No. 02-241).
9. R. D. Kahlenberg, *The Remedy: Class, Race, and Affirmative Action* (Basic Books, New York, 1996).
10. R. D. Kahlenberg, *Washington Post*, 31 March 2003, p. A13.
11. A. P. Carnevale, S. J. Rose, "Socioeconomic status, race/ethnicity and selective college admissions" (Century Foundation, New York, March 2003).
12. T. J. Kane, in C. Jencks and M. Phillips, Eds., *The Black-White Test Score Gap* (Brookings Institution, Washington, DC, 1998).
13. M. Long, "College applications and the effect of affirmative action," *J. Econometr.*, in press.
14. *Gratz v. Bollinger*, 123 S. Ct. 2411 (2003).
15. *Regents of the Univ. of California v. Bakke*, 438 U.S. 265 at 307 (1978).
16. *Freeman v. Pitts*, 503 U.S. at 494 (1992).
17. *City of Richmond v. J. A. Croson Co.*, 488 U.S. at 507 (1989).
18. W. Bowen, D. Bok, *The Shape of the River* (Princeton Univ. Press, Princeton, NJ, 1998).
19. G. Liu, *Michigan Law Rev.* 100, 1045 (2002).
20. *Harvard Gazette*, "Class of '07 selected from pool of over 20,000: Considered the most competitive in Harvard's history," 3 April 2003.
21. J. R. Campbell, C. M. Hornbo, J. Mazzeo, "NAEP trends in academic progress: Three decades of student performance" (NCES 2000-469, U.S. Department of Education, Washington, DC, 2000).



Authors' Biosketches

Shirley M. Malcom
Daryl E. Chubin
Jolene K. Jesse

Shirley M. Malcom

Shirley Malcom is Head of the Education and Human Resources Programs of the American Association for the Advancement of Science (AAAS). The programs include AAAS programs in education, activities for underrepresented groups, and public understanding of science and technology. Dr. Malcom was head of the AAAS Office of Opportunities in Science from 1979 to 1989. Between 1977 and 1979, she served as program officer in the Science Education Directorate of the National Science Foundation (NSF). Prior to this, she held the rank of assistant professor of biology, University of North Carolina, Wilmington, and for two years was a high school science teacher.

Dr. Malcom received her doctorate in ecology from the The Pennsylvania State University; master's degree in zoology from the University of California, Los Angeles; and bachelor's degree with distinction in zoology from the University of Washington. In addition she holds thirteen honorary degrees.

Dr. Malcom serves on several boards, including the Howard Heinz Endowment. She is an honorary trustee of the American Museum of Natural History, a Regent of Morgan State University, and a trustee of Caltech. She has chaired a number of national committees addressing education reform and access to scientific and technical education, careers and literacy. Dr. Malcom is a former trustee of the Carnegie Corporation of New York and a fellow of the AAAS and the American Academy of Arts and Sciences. In 2003, she received the Public Welfare Medal of the

National Academy of Sciences, the highest award bestowed by the Academy.

Dr. Malcom was a member of the National Park System Advisory Board from 1999–2003. She served on the National Science Board, the policymaking body of the National Science Foundation from 1994 to 1998, and from 1994–2001 served on the President's Committee of Advisors on Science and Technology.

Daryl E. Chubin

Daryl Chubin became Director of the new AAAS Center for Advancing Science & Engineering Capacity, at the American Association for the Advancement of Science, in August 2004. Prior to that, he served 3+ years as Senior Vice President, Research, Policy & Programs, at the National Action Council for Minorities in Engineering (NACME) Inc., in White Plains, New York, after nearly 15 years in federal service. Posts included three years (1998–2001) as Senior Policy Officer for the National Science Board at the National Science Foundation (NSF); Division Director for Research, Evaluation and Communication in NSF's Directorate for Education and Human Resources (1993–98); and (on detail) Assistant Director for Social and Behavioral Sciences (and Education) at the White House Office of Science and Technology Policy (1997). He began his federal career in 1986 at the congressional Office of Technology Assessment.

Dr. Chubin has served on the faculty of four universities, including Georgia Tech, where he was promoted to full professor. He has published eight books and numerous policy reports, articles, and commentaries on issues in science policy, human resource development, program evaluation, and engineering education.

Among Chubin's honors are: AAAS Fellow, Past Chair of the AAAS section on Societal Impacts of Science and Engineering, Fellow of the Association for Women in Science, member of the National Academy of Engineering Committee on Diversity in the Engineering Workforce, Integrator for BEST (Building Engineering and Science Talent), and co-recipient of the American Society of Engineering Education Wickenden Award for best paper published in the 2003 volume of *The Journal of Engineering Education*.

Jolene K. Jesse

Jolene K. Jesse is a Program Director for Cross Directorate Activities in the Directorate for Social, Behavioral and Economic (SBE) Sciences at the National Science Foundation. She oversees programs to promote education and to increase the numbers of women and minorities in the SBE fields.

During the development of this guidebook, Dr. Jesse was a Senior Program Associate in the American Association for the Advancement of Science's Directorate for Education and Human Resources Programs, where she conducted research on science, technology, engineering and math education and policy issues, with special emphasis on the representation of women and underrepresented minorities in those fields. She received her Ph.D. in political science from the University of Wisconsin-Milwaukee, and a M.A. from The American University in Washington, DC.

Appendix D: Responses to Freedom of Information Act Requests

The following was sent to “selective public colleges” in 20 states. The accompanying press release, “NAS Affiliates Seek Admissions Data in Twenty States” (http://www.nas.org/print/pressreleases/hqnas/releas_23mar04.htm), notes:

PRINCETON, NJ -- 23 March 2004 -- The National Association of Scholars announced today that twenty of its affiliates, invoking public disclosure laws, are formally seeking access to admissions documents at selective public universities in their states.

NAS Letter To University Presidents

Dear President [X]:

Pursuant to the freedom of information and/or public record disclosure laws of [name of state], and as state citizens, we request all documents at [name of university] regarding the following:

Any statements or discussions of university policies, practices, or procedures, formal or informal, relating to the use of racial and ethnic considerations in admissions to or eligibility for any undergraduate, graduate, or professional school program, activity, or benefit. Such information should include but is not limited to:

- A. Groups for which membership is considered a plus factor or a minus factor and, in addition, how membership in a group is determined for individual students;
- B. How group membership is considered, including the weight given to such consideration and whether targets, goals, or quotas are used;
- C. Why group membership is considered (including the determination of the critical-mass level and relationship to the particular institution’s educational mission with respect to the diversity rationale);
- D. What consideration has been given to neutral alternatives as a means for achieving the same goals for which group membership is considered;
- E. How frequently the need to consider group membership is reassessed and how that reassessment is conducted;
- F. Factors other than race, color, ethnicity, or national origin that are considered or collected in the admissions process (unless your school has a policy of not considering race or ethnicity). If those factors include grades or class rank in high school, scores on standardized tests (including the ACT and SAT), legacy status, sex, state residency, or other quantifiable criteria, then we further request all admissions data for applicants regarding these factors, along with the applicants’ race, color, ethnicity, and national origin and the admissions decision made by the school regarding that applicant, with the name of individual students and other personally identifiable information redacted (so as to comply with, for instance, the Buckley Amendment, the Family Educational Rights and Privacy Act of 1974, 20

U.S.C. 1232g) but with appropriate links, in computer-readable form, so that it is possible to determine through statistical analysis the weight being given to race, color, ethnicity, and national origin relative to other factors; and

- G. Any analysis -- and the underlying data used for such an analysis -- bearing on whether there is a correlation (i) between membership in a group favored on account of race, color, ethnicity, or national origin and the likelihood of enrollment in a remediation program, relative to membership in other groups; (ii) between such membership and graduation rates, relative to membership in other groups; and (iii) between such membership and the likelihood of defaulting on education loans, relative to membership in other groups.

Thank you very much for your attention to this request.

Sincerely,

The National Association of Scholars is America's foremost higher education reform group. Located in Princeton, it has forty-six state affiliates and more than four thousand professors, graduate students, administrators, and trustees as members.

Factors to Consider in Presidents' Responses to the NAS Information Requests: AAAS-NACME Recommendations

College officials receiving the information requested above should pose the following questions before crafting a response:

- ▶ What would be a reasonable response?
- ▶ What do state Freedom of Information Act (FOIA) laws require?
- ▶ Can the expenditure of resources associated with compliance to the request be passed to the requester?
- ▶ Can costs be recovered by the college, especially if preparing the information in the form requested is an undue burden?
- ▶ Does the college's provision of information violate

student confidentiality (e.g., small cell size) or yield distortions of the admissions result, especially when holistic review (considering non-quantitative factors such as the student essay) has been employed?

- ▶ If your state higher education institution is under court-ordered desegregation, e.g., Alabama and Louisiana among the 20 listed here, why respond at all to the request? The questions posed are moot.

I. General Factors to Consider

- A. Most state FOIA laws do not compel respondents to create responsive information for the benefit of the inquiring party.
- B. Most state FOIA laws allow respondents to consider any undue burden that might result from responding to the inquirer's request.
- C. Most state FOIA laws allow respondents to charge respondents reasonable fees for obtaining responses to an inquirer's questions.

II. Specific Factors to Consider

- A. When reporting "groups," include student athletes, band members, legacy enrollees, donor children, in addition to race, ethnicity, gender, age, disability status, geography, and any other characteristics relevant to configuring a diverse class, program, or activity of the college.
- B. Since specific, numerical targets, goals, and quotas for students are illegal, they would not be reported. If weight is reported for any factor considered, then all weights must be reported.
- C. "Critical mass" relative to the campus unit or program remains undefined by the Supreme Court's decision in *Grutter*. Moreover, this inquiry seeks an explanation as to "why," but as noted in the general factors to consider above, FOIA laws do not compel respondents to create responsive information for the benefit of the inquiring party.
- D. "Neutral alternatives" need only be considered; implementation is not required. Also, research has uncovered that many of these so-called alternatives are not race-neutral. See this Guidebook for the design principles dealing with Target Population and Character of the Program.

- E. Given the need for government reporting and NCAA accountability, “reassessment” is likely to be a continuous process.
- F. Is the college the appropriate unit or, instead, the individual components, e.g., the law school? This is the crux of “critical mass” considerations. The request also assumes that criteria other than holistic review are being employed to yield the numbers reported. The use of nonquantitative factors will always appear to favor certain aggregates. Providing the data requested risks distortion of the decisionmaking process used by the relevant unit (and supported by the Court). It is unclear what to do with students who claim mixed-ethnic background or refuse to report. Finally, to put this in “computer-readable form” imposes an undue reporting burden, yields cell sizes that would identify individuals, and assumes that all factors can indeed be reflected by quantitative means.
- G. It is illegal to “favor” a group, so assuming compliance with the law, there is no need to respond to these questions.

Index

A

AAAS/NACME Conference. *See* Joint AAAS/NACME Conference, 2004

Accountability Office, U.S. Government, 38

Adarand Constructors, Inc. v. Pena, 9, 20–22, 27, 49, 68

Affirmative action, 13–27, 33

African American, 40, 49, 56–57, 59

Age Discrimination Act, 15

American Association for the Advancement of Science (AAAS)
Joint AAAS/NACME Conference report, 45–52
NACME and, 10, 16, 24, 25
Project on Science, Technology and Disability, 26

Americans With Disabilities Act (ADA), 15

Authors' biosketches, 87–88

B

Background readings, 81–82

Bakke decision, 9, 19–21, 36, 47

Baldrige quality movement, 39

Brown v. Board of Education, 41, 46

C

California, Proposition 209, 22, 38, 49, 68

City of Richmond v. J.A. Croson Co., 21

Civil Rights Act of 1964, Title VI and Title VII, 13, 14

Colorado Civil Rights Act, 23

Commission on Professionals in Science and Technology (CPST), 33
Select Data Compendium, 55–63

Compelling state interest, 13, 15–16, 36

Congressional Commission on the Advancement of Women and Minorities in Science, Engineering and Technology Development (CAWMSET), 10

Critical mass, 13, 17, 34, 37, 40, 68

D

Department of Defense (DOD), U.S., and STEM workforce, 10

Department of Education (DOE), U.S., Office of Civil Rights (OCR), 9–10

Department of Labor (DOL), U.S., standards for federal contractors, 25

Department of Transportation (DOT), U.S., Disadvantaged Business Enterprise (DBE) program, 26–27

Design principles, 31–32, 41–42
character of the program, 36
evaluation and research, 38–39
faculty recruitment and retention, 39–40
intent of the program, 33
leadership, 40–41
mission statements, 32–33
program context, 37–38
target population, 33–35

Due Process Clause of the 5th Amendment, 15

E

Education Amendments of 1972, Title IX, 13, 14–15, 39

Equal opportunity standards, state-based, 22–23

Equal protection, 13

Equal Protection Clause of the 14th Amendment, 15

F

Federal contractors, 25

Federal equal opportunity standards
equal protection and due process clauses, 15
levels of judicial scrutiny, 15–18
significant federal legal opinions, 18–22
Title VI, Title VII, Title IX and A.D.A., 13, 14–15, 39

Federal paradigms, 24
equal opportunity standards imposed on federal contractors, 25
modeling ongoing federal programs, 26–27
NSF Criterion II, 25
SEEOA, 24

Florida, Executive Order 99–281, 23

Freedom of Information Act requests, responses to, 89–91

G

Government Performance and Results Act of 1993 (GPRA), 39, 50

Gratz v. Bollinger, 9, 10, 11, 18–19, 20, 50

Grutter v. Bollinger, 9, 10, 11, 16, 18–19, 20, 25, 32, 36

H

Hart-Rudman Commission, 10

Health Education and Welfare, U.S. Department of, and *Bakke* decision, 9

Hispanics, 49, 58, 63
Hopwood v. Texas, 18, 34, 49, 68

I

Intermediate scrutiny, 17

J

Joint AAAS/NACME Conference, 2004, 10–11
 agenda, 65–66
 report, 45–52
 “Science, Technology, and America’s Future”
 presentation, 73–79
 “The Beauty of Diverse Talent” presentation, 69–72
 timeline, 67–68
Justice Department, U.S., 9

L

*Land of Plenty: Diversity as America’s Competitive
Edge in Science, Engineering and Technology*
report (CAWMSET), 10, 50, 68

M

Michigan
 affirmative action cases, 9–10, 18–19
 Ballot Initiative, 23
Minorities in Technology, Engineering and Science
 (MITE2S), 78

N

Narrow tailoring, 13, 16, 34, 36
National Action Council for Minorities in
 Engineering (NACME)
 AAAS and, 10, 16, 24, 25
 Joint AAAS/NACME Conference report, 45–52
National Aeronautics and Space Administration
 (NASA), ACCESS (Achieving Competence in
 Computing, Engineering, and Space Science)
 program, 26
National Association of Scholars (NAS), Freedom of
 Information Act requests, 89–91
National Defense Education Act of 1958 (NDEA), 46
National Institute of General Medical Sciences
 (NIGMS), 26
National Institute of Health (NIH), 26
National Science Foundation (NSF), 10
 ADVANCE program, 26, 49, 68
 Alliances for Graduate Education and the
 Professoriate (AGEP) program, 26
 Criterion II model, 24, 25
 Research in Disabilities Education program, 26

O

Office of Civil Rights (OCR), U.S. Department of
 Education, 5, 9–10, 51, 78

Q

“Quiet Crisis”, 70–71
Quality Education for Minorities (QEM), 48–49

R

Race/ethnicity, 15–16, 25, 32, 37, 58, 60–61
Race-neutral alternatives, 6, 13, 17, 21, 34, 36, 90
Regents of the University of California v. Bakke,
 9, 19–21
Rehabilitation Act, 15, 25

S

Science and Engineering Equal Opportunities Act
 of 1980 (SEEOA), 10, 24, 47–48
Small Business Administration (SBA), 8(a)
 Business Development Program, 26
State-based equal opportunity standards, 22–23
Strict scrutiny, 13, 15, 20
Supreme Court, U.S., educational policy decisions,
 9, 16, 18–22, 27

T

Texas 10- Plan, 23, 34
Texas Higher Education Opportunity Project, 34
“The Long Road to Race-Blindness”, 83–85
Title IX, 13, 14–15, 38–39
Title VI, 13, 14
Title VII, 13, 14

V

Vietnam Era Veterans’ Readjustment Assistance Act, 25

W

Washington State, 1–200, 22
Weak scrutiny (rational review), 18
Women in Science and Engineering, 10, 14, 25–26, 34,
 38, 57–58, 75–76

