Appendix B: The Beauty of Diverse Talent

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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 information 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.