

Welcoming Remarks 5

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Joseph Bordogna serves as Deputy Director and Chief Operating Officer of the National Science Foundation (NSF), having served previously as head of NSF's Directorate for Engineering. Complementary to these tasks, he is a member of the President's Management Council and has chaired committees on Manufacturing, Environmental Technologies, and Automotive Technologies in the President's National Science and Technology Council (NSTC).

Thank you for the opportunity to make remarks today. The subject of this workshop is central to realizing NSF's strategic focus on enabling its domestic population. The success of our nation's future depends on attracting all members of its diverse population to careers in science and engineering. I think all of us here recognize that if our 21st-Century science and engineering workforce is not representative of our domestic population, we as a nation will miss the most promising opportunity for continued US success. The loss will cut two ways -- it will rob worthy individuals of the chance to enrich their lives and to contribute to the engine of our economy and culture, and it will undermine the ability of our nation to prosper within an increasingly competitive world.

Along the way in our careers, we have learned that wanting to emphasize the participation of domestic students in S&E careers is just not enough. There must be action agendas that create paths for making this happen... along with the hard, dedicated work that must be done to realize results.

Your work here at this workshop is fundamental to accelerating action on the know-how the science and engineering community, within its separate parts, has garnered over the past three decades on how to be inclusive. The intent now can be to capitalize on these myriad separate investments by integrating and synergizing them to embrace scope and realize scale.

As stated in the material describing this workshop, one of your principal aims will be to identify ways in which NSF can help broaden participation of Asian Americans and Pacific Islanders in its programs. Of particular interest is reaching out to potential grantees (principal investigators, post-docs and students) in the AAPI community. You have been chosen to participate because of your involvement with NSF programs and demonstrated interest in this area. You can help us think through how to enable all members of our nation's population to profit from connections that integrate across NSF's entire set of programs.

NSF has developed successful building blocks of its investment in people, ideas, and tools in one way or another, over several decades. Now is the time to integrate them. Now is the time to make the whole greater than the sum of the individual building blocks.

In this context, the future of science and engineering lies not only within the great legacy of success we've enjoyed up to today, but also, and more importantly, in the making of the scientists and engineers of tomorrow. Foremost in this effort is our design of the process by which we enlist, educate, engage, include, and instill passion and ethical behavior in the next generation of scientists and engineers. The design is something we can formulate now – it is a necessary next step in an accelerated journey toward change, change that will neither confine nor constrict our potential.

Most of us would agree that U.S. science and engineering education is the best in the world. The frontier research of cutting-edge tools and skill sets that characterize our nation's science and engineering schools make them intellectual magnets, drawing students from every nation of the world. The result of this global corps of scientists and engineers is the diffusing of new knowledge and technology across international borders, thus contributing to our common future on the planet.

But this raises an obvious and sobering question. If U.S. science and engineering education is the greatest in the world, why aren't domestic students flocking to the fold?

We have to ask ourselves: Will there be a robust mix of knowledgeable workers to meet the need for such talent in our society? Will an exodus of international talent, combined with growing numbers of engineers trained in other nations throughout the world, and staying where they are trained, dull the competitive edge we enjoy in the United States?

The U.S. has neglected proactive recruitment of our domestic talent. As a strategic, as well as equitable, manifestation of this intent for societal advancement, we unequivocally need more of them in the S&E workforce. If we don't encourage individuals from all diverse groups to enter into the complex and dynamic fields of science and engineering, we lose out on the opportunity to maximize the potential of our own nation's intellectual capital.

The differences that abound in race and ethnicity in our society should be encouraged and embraced. They are a gift for our future and should be nurtured. The divisions should be erased. They are a drag on our energy and creativity.

In this context, there is something more enabling about the era in which we live than any of the past.

We have moved into a whole new threshold of capabilities that breach with the past and that will catapult us beyond today's horizons, thereby muting the divisions. The advent of cyber infrastructure has resulted in a potential leveling of the playing field – it has endowed many with the capability to find the information and tools they seek to educate themselves and make contributions. Cyber infrastructure is an equalizer, an enabler. It will increasingly democratize education and opportunity. Despite such tools, though, unless the desire and the

drive exist in the individual, capability alone will not lead to success. This is where we come in. It is our job to plant the seeds of curiosity, interest, enablement, and the kind of education from which both present and future generations will sow the benefits.

But how do we go about making this change? Our well being as individuals and as a nation depends, now and far into the future, on how well we prepare all our human resources today. Every American must be “counted in” when providing opportunities and “counted on” for contributions to society. But before we can count on people, we must assume some responsibility for their preparation. That’s why, at NSF, investment in “People” is one of our four strategic goals.

As steward of the health of our nation’s science and engineering enterprise, NSF works at the frontier of research and education, where risks and rewards are high, and where potential benefits to society are most promising.

Congress chartered the National Science Foundation to “promote the progress of science; [and] to advance the national health, prosperity and welfare.” Preparing the nation’s workforce for the challenges of the 21st century world is central to this mission. The workers we educate today will be tomorrow’s discoverers, innovators and entrepreneurs, and the guardians of our health and well-being. We must make sure that they are as well educated as workers anywhere in the world. And we must make sure that they represent our diverse society—all of it.

Just a few days ago, *The New York Times* interviewed Praveen Chaudhari, the director of Brookhaven National Laboratory and a former vice-president for science at IBM. Asked to provide insight on the immigration of scientists, Dr. Chaudhari replied, “In India, it’s well known that you can go to the U.S. and do well. The reason most South Asians come is because they hear in the newspaper about all the great things that are possible, the jobs, the lack of discrimination.”

In other words, they’ve seen the light of Lady Liberty’s torch. Sometimes it seems the torch is more difficult to see from within our borders than from outside them. The Statue of Liberty’s torch must light the way for those inside our borders as well as those from across the borders. What we need is a genuine open-door policy.

One of the challenges we must accept, if we aspire to be leaders, is this: How can we enable our domestic youth to be full participants in our great democratic system while continuing the successful policy of embracing those from abroad?

At today’s workshop, you will be spending time on addressing an individual student’s journey to a scientific-based career, and this path may well be idiosyncratic and serendipitous. We don’t want to eliminate serendipity, or attempt to make uniform pathways. We do want to eliminate dead ends and roadblocks, build connecting roads or bridges where none exist, open locked doors, knock down barriers, and re-grade some of the steeper slopes. These are well-known tasks for scientists and engineers, though not easy ones.

Many of our existing programs address one or more of these impediments. We need now to

look at them all holistically, as parts of an interconnected system. The behavior of a system depends both on the characteristics of the individual pieces and on the way in which they are tied together. The innovative ideas may well come from looking at the connections between various pathways through the educational system and their effect on students' mobility through the entire process. The goal is synergy—combining individual career pathways supported by institutions or programs into an intersecting, supportive network whose variety and capacity exceeds the sum of its parts.

As your workshop proceeds, please discuss what we do and don't know about achieving that kind of synergy. Examine the kinds of connections that have worked well in the past, and the kinds that haven't. The roadblocks and barriers to be overcome may or may not be obvious.

As you ponder how to optimize the return on NSF's investment in the AAPI community, I implore you to think holistically. Think about how we can use the tools and knowledge we already have to restructure career pathways in science and engineering. Envision a network of pathways which allows students from many different starting points to set out for a variety of endpoints—researcher, educator, industry leader, entrepreneur. Where you see barriers, think about how to build new paths around them. Where you see chasms, build bridges across them. There will still be plenty of opportunities for the idiosyncratic twists and turns that characterize a life in science and engineering.