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Good afternoon. It's a pleasure to have this opportunity to speak with you about NSF activities and some of the challenges we can address together.

I want to congratulate the University of Rhode Island for hosting this opportunity to learn about NSF, and to seek partners and collaborators among academic institutions, industry, and government.

This is also an opportunity for me to learn something about what *you* are doing here in Rhode Island. I enjoyed a very instructive visit to the Center for Proteomics at Brown University this morning, and I'll be visiting the Center for Marine Life Sciences at URI's Narragansett Bay campus this afternoon. These facilities are helping researchers to address critical questions in genomics, proteomics, marine life sciences and global climate change. That's already quite an education for a materials scientist like myself.

Let me follow up on that theme of global science. In the past, the United States enjoyed a commanding position in science and engineering talent and innovation. However, the increasing global competition has forced us to take a hard look at the way we conduct research and education, and prepare for a different sort of future. At the reception here last evening I heard great things about the International Engineering Program at URI and what it is doing to provide students with a global perspective.

In a global economy, knowledge and ideas can emerge from any region of the world, and travel in a flash across the planet. We are in an idea race, an innovation race, and an information technology race.

More nations than ever are investing in education, research and research infrastructure, as the keys to economic growth. At the same time, nations are engaging in collaborative science and engineering to boost their

respective economies. In the United States, we want to maintain our lead, while at the same time enhancing our role as partner. But there's little doubt that America's competitive edge is under siege. The World Economic Forum recently downgraded its index for US competitiveness from first place to sixth place in the world, and the US trade balance for high technology products has now been negative for six years in a row.

NSF's task is to keep U.S. science and engineering positioned on the breaking frontier and to train the next generation of workers who will advance that frontier. These investments are critical for replacing our aging workforce at universities and federally funded laboratories. Our third objective is to help your institutions maintain the world-class facilities that attract the top international partners and provide the citizens of the world with new knowledge and technology.

NSF funds fundamental research and education projects in all fields of science and engineering. We work at the leading edges of science and engineering, and we often take on high-risk proposals with the potential to fuel major leaps in research.

To stay at the frontier, NSF relies on thousands of people – like yourselves - in the science and engineering community to alert us to new approaches, innovative concepts, and emerging trends. We invite experts in every field to help NSF identify funding priorities, and to participate in panels that review proposals and make funding recommendations. *This bottoms-up process can lead to transformational results.* Our investments in research and education ultimately help to improve the quality of people's lives, and keep the nation safe, prosperous, and competitive.

If you are new to the NSF process, you'll quickly realize that a fast-changing frontier creates an abundance of opportunities for your institutions to put forward new and innovative ideas.

How fast does that frontier move? Seven years ago nanotechnology was an emerging area of federal investment. Today, more than 60 countries have established programs in nano, and there are active programs in all 50 states in the US.

Of course nanotechnology is still not a mature field. But we have moved forward -- from exploring natural processes and single phenomena at the

nanoscale ... to engineering simple structures ... to creating devices and complex systems with the ability to change their properties while they perform.

A study by the Woodrow Wilson Center for Scholars and The Pew Charitable Trusts published last year shows that the public has to be convinced that the benefits of this new technology -- in medicine, energy, or the environment -- outweigh any risk. And, we owe it to our citizens to demonstrate that investments in science and technology lead to safe, predictable outcomes.

So the advance of one frontier has created opportunity at another: a growing area of NSF investment now addresses the environmental, health, and safety impacts of nanomaterials, by exploring how nano-engineered particles and materials interact with the living world.

I want to say a few words now about the budget picture for science and engineering. Marie Curie said that "the way of progress is neither swift nor easy." Our experience teaches us that it is also not predictable.

Just last fall I spoke confidently to an audience at the University of Arkansas about the prospects for a substantial increase in the NSF budget for FY 2008 -- a critical step towards doubling the NSF budget over the next 10 years. As you are probably well aware, those glowing prospects collapsed in the final days of the 2008 budget appropriation process.

As you heard this morning from NSF's budget guru Tom Cooley, we've fallen substantially short for 2008. The result of NSF's current budget allocation is that hundreds of grants, early career faculty, and promising graduate students are going unfunded. Potential innovations have been delayed or deferred. And, what's equally disconcerting, the momentum of emerging fields has been sidetracked, and important new projects put on hold for a year.

To quote NSF's director, Dr. Arden Bement, "In today's fast-paced economy, we cannot afford such stagnation. We need your help in forcefully voicing the message that we cannot maintain the U.S. position on the frontier, and produce the talent and facilities to advance that frontier, without consistent, reliable resources."

Broadening participation in science and engineering is one of the ways NSF is making sure the nation stays at the forefront of global change. We want to deepen and enrich our national capacity with a diversity of perspectives and full participation from all regions in the science and engineering enterprise.

This year, despite painful adjustments to budget realities, NSF is increasing its support for the Experimental Program to Stimulate Competitive Research. EPSCoR is designed to increase the capacity and competitiveness of jurisdictions and states that have historically received less R&D funding. I'll be saying more about this program tomorrow in one of the breakout sessions.

For now, I want to emphasize two things. First, EPSCoR funds are available for all types of science and engineering research and education. Last year, NSF moved the administration of the EPSCoR program to the Office of the Director, in order to ensure that this activity is integrated across all research directorates.

Second, I encourage you to participate in reviewing proposals submitted to the EPSCoR program, as well as to programs in your disciplines. Participating in merit review panels is an excellent means of networking and learning more about the characteristics of successful proposals.

After carefully weighing our priorities for the coming season, NSF remains firmly committed to the growth of cyberinfrastructure. In the EPSCoR program and elsewhere, we are exploring the potential of virtual organizations for increasing the productivity of teams of scientists and engineers.

This year, NSF launched the Cyber-enabled Discovery and Innovation program. CDI is a five-year investment in applying high-end computational capabilities to frontier research. NSF's investments in terascale and petascale computing, in middleware, and in international network connections contribute to this goal.

Currently, the ability to extract knowledge from the explosion of data generated by telescopes, satellites, surveys, and sensors, and transmitted over the Internet, is much like uncovering a 'needle in a very large haystack.'

CDI will explore concepts and tools that allow us to more easily exploit these data-rich, interacting systems.

For example, in 2009, researchers will begin to synthesize a wealth of data about system-scale environmental change in the Arctic and Antarctic. CDI will expand our ability to analyze and understand such complex systems--and, ultimately, to predict their behavior. The ability to develop models that simulate the features of systems found in nature, society, and the engineered environment will transform the way we approach global grand challenges.

Many of these investments converge at the nexus of science and engineering centers. These centers attract partners from universities and industries at home and abroad with a common interest in accelerating innovations from concept to marketplace.

Last year, one of NSF's Science and Technology Centers was recognized by the United Nations for its remarkable research into water usage and water management in arid regions. The center's 17 partners include the Los Alamos and Sandia National Labs.

In a few weeks, we will announce a new competition for the next round of Science and Technology Centers. The deadline for pre-proposals will be in September or October, and we expect to establish about 5 to 7 new STCs that will open up new areas of science and help connect research with innovation.

Many of the investment areas I've mentioned involve several disciplines and various perspectives. NSF, through its investments in the building blocks of innovation, also contributes to building bridges among disciplines, economic sectors, research, and education.

It takes partnership to accomplish these goals. Partnerships speed the transformation of knowledge into application, and are important to sustaining America's competitive position. We encourage partnerships that include not only multiple perspectives, but opportunities to leverage federal resources with assets from state and regional government, and from the private sector. I was encouraged at dinner last night by what I learned about the activities of the Rhode Island Science and Technology Council. STAC is a partnership that’s helping to develop a clear strategic vision for innovation here in Rhode Island.

With these commitments to science and engineering success, I believe discovery and innovation still have a bright future in the US. However, we cannot hope to sustain that future without a parallel commitment to educating and preparing the workforce.

In recent years, NSF has redoubled its effort to support the training of our young people in the skills that count in a global workplace. These skills include the ability to adapt quickly to new ideas and technology, and to collaborate with colleagues across boundaries and borders.

At NSF, we believe that research and education go hand-in-hand. So we encourage all of our grantees to consider how their work can contribute to the enrichment of students, and the development of educational activities. We fund more than 40 programs to improve math and science education. And all of NSF's directorates support innovative efforts to integrate research and education.

One example is a new award from NSF's Division of Ocean Sciences, with co-funding from our Directorate for Education and Human Resources, to support Gail Scowcroft at the University of Rhode Island as the lead person on the Interim Network Leadership Team for COSEE, the Centers for Ocean Sciences Education Excellence. COSEE is successfully building links between the Ocean Sciences and Education communities.

And in the arena of broadening participation, NSF's ADVANCE program aims to contribute to the development of a national science and engineering academic workforce that includes the full participation of women in all levels of faculty and academic/administration.

For example, a recent ADVANCE award to Professor Pamela O'Neill and colleagues at Brown University aims at changing the working environment to reduce faculty attrition and ensure that women faculty, in particular, can reach their full potential and ultimately assume leadership positions.

All of the programs I've mentioned -- in research *and* education -- depend on robust investments, the talent and skills of dedicated people, and access to a first-rate science and engineering infrastructure.

I could describe many more ways in which NSF investments support development of the nation's innovation base and help meet the challenge of a global economy. But I'll stop here, because I know you'll be hearing more about our programs today and tomorrow.

For now, I extend my sincere invitation to all of you to join the NSF family of researchers and educators. You are welcome to participate with us in many ways - as a reviewer or a panelist for example, as a grantee (we hope!), or even as visiting staff member or "rotator". Through our individual and collective commitments, we will move this enterprise forward, and humanity will surely reap the benefits.

Thank you for your attention.