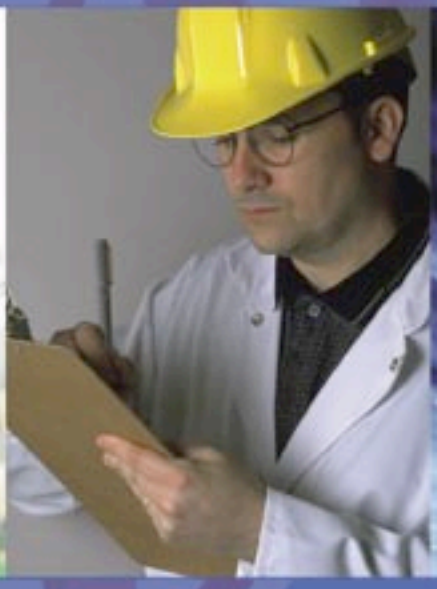
The National Summit on Competitiveness

Investing in U.S. Innovation

December 6, 2005
Washington, D.C.



A national gathering of Executives Concerned About America's Future Competitiveness

Statement of the National Summit on Competitiveness: Investing in U.S. Innovation

Actions

Revitalize Fundamental Research

- Increase the federal investment in long-term basic research by 10 percent a year over the next seven years with focused attention to the physical sciences, engineering, and mathematics.
- Allocate at least 8 percent of the budgets of federal research agencies to discretionary funding focused on catalyzing high-risk, high-payoff research.

Expand the Innovation Talent Pool in the United States

- By 2015, double the number of bachelor's degrees awarded annually to U.S. students in science, math, and engineering, and increase the number of those students who become K–12 science and math teachers.
- Reform U.S. immigration policies to enable the education and employment of individuals from around the world with the knowledge and skills in science, engineering, technology, and mathematics necessary to boost the competitive advantage of the United States.
- Provide incentives for the creation of public–private partnerships to encourage U.S. students at all levels to pursue studies and/or careers in science, math, technology, and engineering.

Lead the World in the Development and Deployment of Advanced Technologies

- Provide focused and sustained funding to address national technology challenges in areas that will ensure national security and continued U.S. economic leadership, including nanotechnology, high-performance computing, and energy technologies.

The National Summit on Competitiveness has one fundamental and urgent message: if trends in U.S. research and education continue, our nation will squander its economic leadership, and the result will be a lower standard of living for the American people.

Global conditions are changing. The competition is getting better at creating and deploying new knowledge. Information technologies are enabling the rapid diffusion of knowledge, know-how, and advanced manufacturing capacity. Talent, technology, and capital are available globally. In this new economic landscape, past performance is no guarantee of future success.

The good news is that America is able to meet these challenges from a position of economic strength. We have the resources in people, ideas, and financial strength to invest in a successful future. We will falter only if we are complacent.

This clarion call has been sounded by our nation's business and academic leaders who have come together over the past several months to issue a series of reports that convincingly document the threats to continued U.S. economic primacy and, more important, offer an action agenda to address these challenges.

These leaders have called attention to the resources that other countries are pouring into building their science and technology enterprises. China doubled its investment in research and development (R&D) as a percentage of gross domestic product (GDP) from 0.6 percent in 1995 to 1.2 percent in 2002 (during a time of record GDP growth). More than one-third of the member countries of the Organization for Economic Cooperation and Development have increased government support for R&D by an average rate of more than 5 percent annually over the past seven years. In fact, many of these countries are emulating our innovation model—leveraging investment in science and technology to create market leadership—with remarkable success. Consider that

- Asia now spends as much on nanotechnology as does the United States.
- Foreign-owned companies and foreign-born inventors now account for nearly half of all U.S. patents.
- U.S. 12th-grade students recently performed below the international average of 21 countries on a test of general knowledge of mathematics and science.
- Eleven nations outperformed the United States in a 15-nation assessment of students' skills in advanced mathematics. Students in four nations had scores similar to those of U.S. students, while no nation scored significantly below the United States.

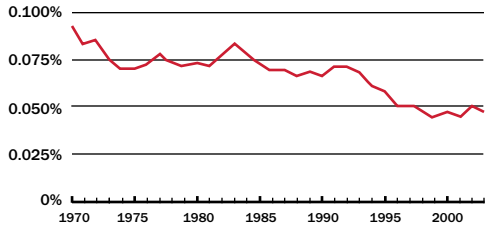
In October, the National Academies released a report, *Rising above the Gathering Storm*, that represents the latest addition to this growing consensus of concern within the private sector. The report built upon a series of recent reports on the competitiveness challenge, including reports by the sponsors of this summit: AeA (*Losing the Competitive Advantage*, February 2005), the Business Roundtable* (*Tapping America's Potential*, July 2005), the Council on Competitiveness (*Innovate America*, December 2004), and the National Association of Manufacturers (*The Looming Workforce Crisis*, September 2005).

The National Summit on Competitiveness represents the capstone of this growing commitment by our nation's business and academic leaders to bring the findings and recommendations of these reports directly to policy makers. Throughout the post-World War II period, America's leaders and its citizens have pursued policies that encouraged innovation by funding federal investment in basic research, improving education at all levels, allowing the United States to attract the best and the brightest from around the world, and facilitating the transfer of new knowledge from the lab to the marketplace. Today, the administration, the Congress, and the public must follow in those footsteps and take the actions necessary to keep the United States at the forefront of an increasingly competitive global economy.

The reports mentioned above provide a blueprint for building America's future. At this summit, we want to call attention to the following recommendations for the federal government, drawn from those reports, which we believe are of surpassing importance if the United States is to continue its historic and unique role as a leader among nations driven by the power of innovation.

** The Business Roundtable report was issued jointly by AeA, Business-Higher Education Forum, Business Roundtable, Council on Competitiveness, Information Technology Association of America, Information Technology Industry Council, Minority Business RoundTable, National Association of Manufacturers, National Defense Industrial Association, Semiconductor Industry Association, Software & Information Industry Association TechNet, Technology CEO Council, Telecommunications Industry Association, and U.S. Chamber of Commerce.*

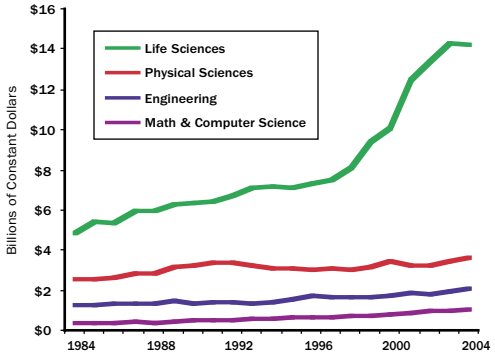
Ratio of U.S. Federal Government Funding for Physical Science Research to U.S. GDP, 1970–2003



Source: American Association for the Advancement of Science
www.aaas.org/spp/re/guidisc.htm
Compiled by the APS Office of Public Affairs

The Task Force on the Future of American Innovation
http://futureofinnovation.org

Federal Obligations for Basic Research 1984–2004



Source: NSF, WebCASPAR

❶ **Increase the federal investment in long-term basic research by 10 percent a year over the next seven years with focused attention to the physical sciences, engineering, and mathematics.** Investment in fundamental research has long been the bedrock of American innovation. Publicly funded research launched the semiconductor and Internet revolutions, global positioning technology, biotechnology, and nanotechnology, to name just a few. But the nation's investment in knowledge creation as a percentage of national wealth has declined significantly since the post-Sputnik surge and must be restored if the United States is to remain competitive.

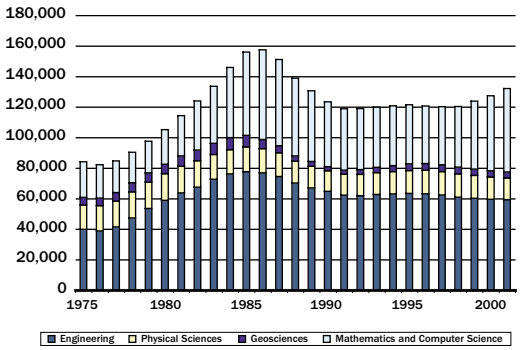
❷ **Allocate at least 8 percent of the budgets of federal research agencies to discretionary funding focused on catalyzing high-risk, high-payoff research.** Compounding funding concerns, the drift of publicly funded research away from the frontiers of knowledge is a barrier to breakthroughs. Over time, the federal investment has grown more conservative—increasingly driven by consensus, precedent, and incremental approaches. Ensuring that the government is funding high-risk, high-payoff research will be critical to enabling the United States to "leapfrog" ahead of the competition.

Task Two: Expand the Innovation Talent Pool in the United States

❸ **By 2015, double the number of bachelor's degrees awarded annually to U.S. students in science, math, and engineering, and increase the number of those students who become K–12 science and math teachers.** Everything else the United States does to stimulate innovation will be for naught if the nation does not have a student population that can compete in science and math with its counterparts from around the world. Yet the pipeline of science and engineering talent is contracting not expanding. In 2000, only 11 percent of all bachelor's degrees in the United States were in natural science or engineering, far below the world's average of 23 percent and about one-fifth of China's 50 percent. The federal government can influence the number of undergraduate students pursuing science, math, and engineering degrees, as well as careers in science and math education through such means as student loan forgiveness, targeted undergraduate financial aid, undergraduate scholarships, and portable graduate-level fellowships that, by allowing students to pursue their scientific interests, can boost retention at the undergraduate level. The federal government can also encourage colleges and universities to develop additional means to expand the number of science, math, and engineering majors, including through programs that give students experience in industry and bring industry scientists into the classroom. The federal government also needs to help improve K–12 science and math education, including through encouraging more interactions among states, school districts, and institutions of higher education.

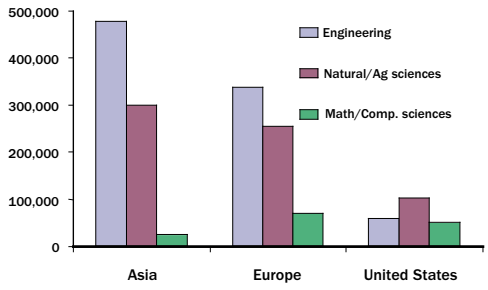
❹ **Reform U.S. immigration policies to enable the education and employment of individuals from around the world with the knowledge and skills in science, engineering, technology, and mathematics to boost the competitive advantage of the United States.** U.S. economic success has always been based, in part, on the ability to attract the best and the brightest from around the world. If U.S. companies are to continue to be innovative and create new jobs, they must be able to hire the world's best scientists, engineers, and mathematicians. Current immigration policies discourage foreign students at U.S. universities from remaining in the United States after graduation, putting U.S. companies at a disadvantage. This situation is especially problematic because the majority of master's and PhD candidates in the physical sciences and engineering at U.S. institutions are foreign nationals. There is a striking consensus among private-sector leaders on the urgent need to remove the legal and procedural barriers that exist to hiring highly educated foreign nationals, particularly those who have been educated in the United States.

Bachelor's Degrees in Physical Sciences and Engineering, 1975–2000



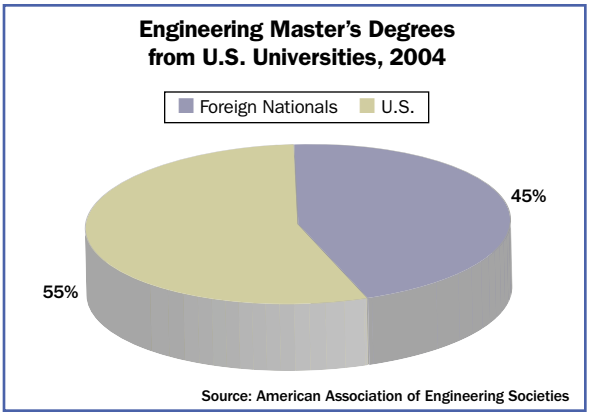
Source: NSF Science and Engineering Indicators, 2004

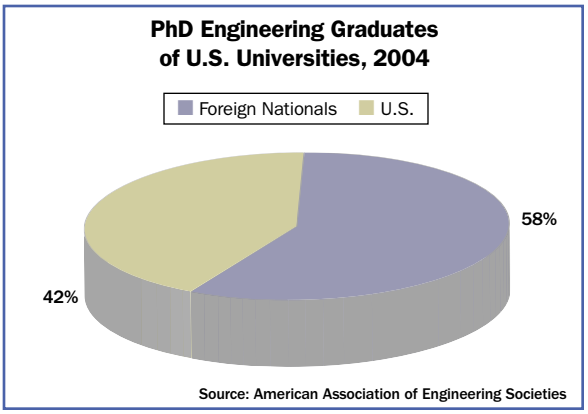
First University Science and Engineering Degrees in Asia, Europe, and the United States, 2000*



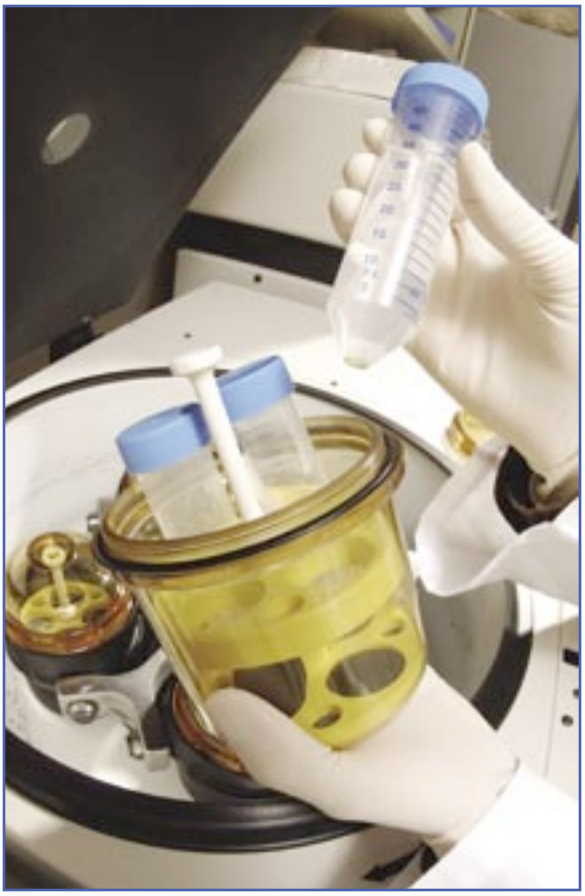
Source: NSF 2004 S&E Indicators, Appendix Table 2–33
*Data included in the year 2000 or the most recent year.

❺ **Provide incentives for the creation of public–private partnerships to encourage U.S. students at all levels to pursue studies and/or careers in science, math, technology, and engineering.** Few would disagree that the challenge of recruiting more students into science and engineering careers begins in the K–12 education system. Efforts by schools to bolster math and science education will be more effective if they are supplemented by public–private efforts to give students exposure to scientists and engineers. Students should have opportunities to participate in programs that help them see the wide range of career options open to them if they have a strong foundation in science and math. The National Association of Manufacturers' *Dream It, Do It* campaign in Kansas City is one successful approach to inspiring students to study science and math.





Task Three: Lead the World in Development and Deployment of Advanced Technologies



6. **Provide focused and sustained funding to address national technology challenges in areas that will ensure national security and continued U.S. economic leadership, including nanotechnology, high-performance computing, and energy technologies.** A healthy level of investment in basic research is a necessary but not sufficient condition for economic success. The government also needs focused efforts designed to facilitate the development and deployment of critical technologies that serve vital national missions—energy independence and national and homeland security—as well as economic competitiveness goals. Focused efforts should include peer-reviewed, project-oriented programs that encourage fuller utilization of technology and innovation production methods by small and medium-size businesses. The federal government should also encourage exchanges and collaborations between academic and industry scientists.

These recommendations focus on the critical topics of research and education. Obviously, there is more the federal government needs to do to promote innovation, including in areas (e.g., tax policy, intellectual property) not covered by these recommendations, and there is much that business, academia, and state and local governments must do. The intent of the summit is to highlight the most important steps the federal government should take, starting right now, to ensure a continued high standard of living for the American people. Our nation's leaders, and the American public, must take this advice to heart. If we fail to act and our nation declines, we will not have to search for the reasons. The repeated calls for action will be there for all to see; we will only be left to wonder why none was heeded.