Testimony of Craig R. Barrett, Chairman, Intel Corporation

Mr. Chairman, I appreciate the opportunity to appear today before the Committee to discuss the broad challenges facing the U.S. economy from the new dynamics of global competition. I am pleased to add my voice in support for your initiatives, H.R. 362 and 363, which build upon prior work done in this Committee in the vital areas of K-12 teacher preparation in math and science (HR 362), and increased funding for basic research in the physical sciences conducted through the programs of the National Science Foundation, the Department of Energy, NASA, NIST, and the Department of Defense (HR 363).

I note that one of the key components of HR 362 is strengthening the impact of the Noyce scholarship program, established by the NSF Authorization Act of 2002, to create incentives for colleges and universities to improve the training of STEM teachers and increase scholarships provided for science, math and engineering majors who pursue teaching credentials.

I worked closely with Bob Noyce for many years and want to reflect briefly upon his life and experience, and his contributions to innovation in America, which are emblematic of what it is all of us here on this panel are trying to communicate in the strongest possible terms.

Bob Noyce thrived in the environment of learning created by a superb and dedicated physics professor at his alma mater, Grinnell College in Iowa. That professor had obtained two of the very first transistors produced by William Shockley and his team at Bell Labs through his relationship with the President of Bell Labs. Noyce became enthusiastic about this new field of research, and furthered his education at MIT, emigrated to California, and went to work for Shockley Semiconductors. Later of course, he went on to be one of the founders of Fairchild Semiconductor and Intel Corporation, and acknowledged as one of the co-inventors of the integrated circuit along with Jack Kilby of TI.

Here's the point: **a good teacher, a research lab, an engaged student** – the resources that are critical to innovation, the creation of new technologies, and new industries. America has always taken for granted that these foundations of innovation will be there, providing the basis for American economic success.

But we can no longer take those things for granted, which is why the Innovation Agenda announced by the new Democrat leadership in the House, the President's American Competitiveness Initiative, and your legislation, are so important.

The Gathering Storm report has now been out for about 18 months. The proclamation we released just before this hearing is another attempt to focus the Congress on the **need for action.** We've had enough reports – perhaps now that elections are past, Congress can get down to business. Your bills are important first steps, in education and research. The recently approved, substantial FY '07 funding increases for NSF, NIST, and DoE represent a critical down payment on the need for expanded research in the physical sciences, and I thank our Democrat leadership in Congress, particularly Speaker Pelosi, for making that happen.

Intel has been pushing hard for these things for many years, long before the Gathering Storm Report. All the pieces of the innovation system have to work right together –

- K-12 education, with good teacher well prepared in math, science, and engineering
- University research and teaching programs that build talent for the future
- Government-funded basic research that provides seed corn for new technologies
- Ability to hire and retain the highly talented foreign students who study in the US
- a strong, balanced patent system that produces quality patents and fair results in the courts
- A tax system that fosters investment in applied research, and creation of new manufacturing capabilities in America

Those are the keys to long-term American economic success. And it is, I think, indisputable that we have allowed these important foundations of innovation to erode.

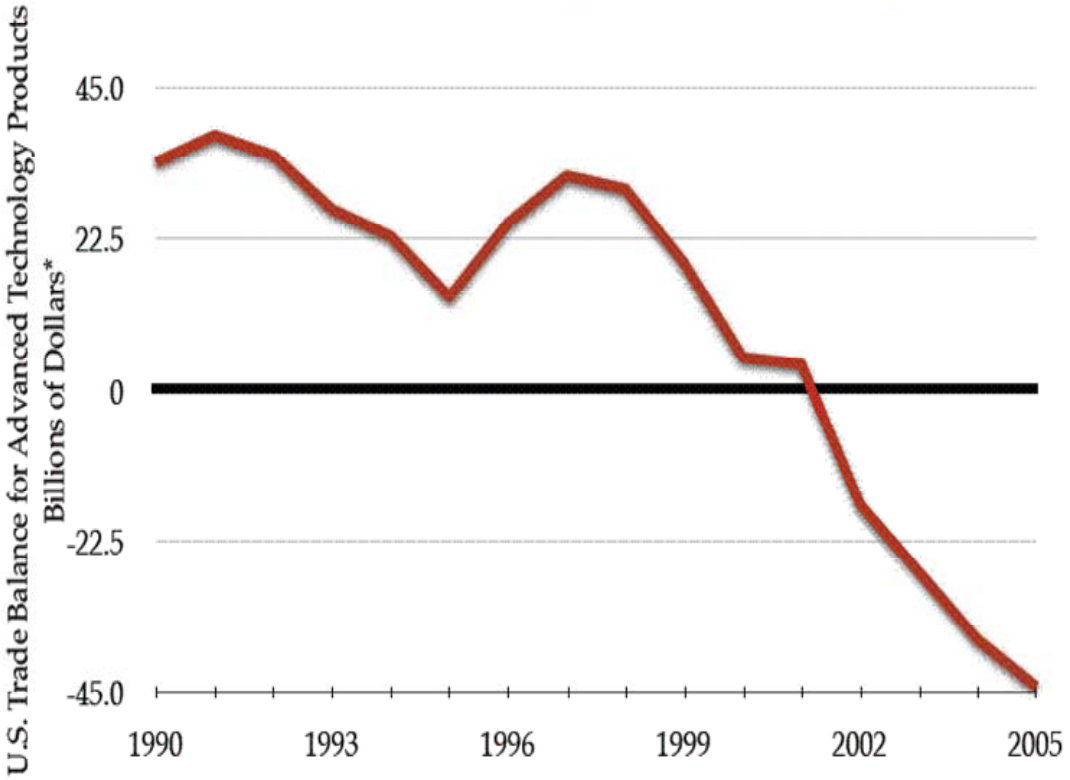
- We have come close to having critical research facilities – such as the Brookhaven heavy ion collider – close.
- We have had close calls on funding for the Focus Center Research Program, which is key to expanding the frontiers of knowledge in semiconductor manufacturing.
- And university graduate programs are threatened for lack of research funds and U.S. students.

Some say "we've heard this before – Japan was going to overtake us in the 80's". And this is the most important point, one I hope all members of the Committee will take away from this hearing.

In the 80's, the challenge was quality in *manufacturing*. We rose to that challenge in the decades of the 80's and 90's. **Today, however, the challenge is *knowledge creation*** – and which countries will be the leaders in discovery and speeding discoveries into the marketplace. The rest of the world has caught on to our strengths – and is imitating what we have done right for the past century.

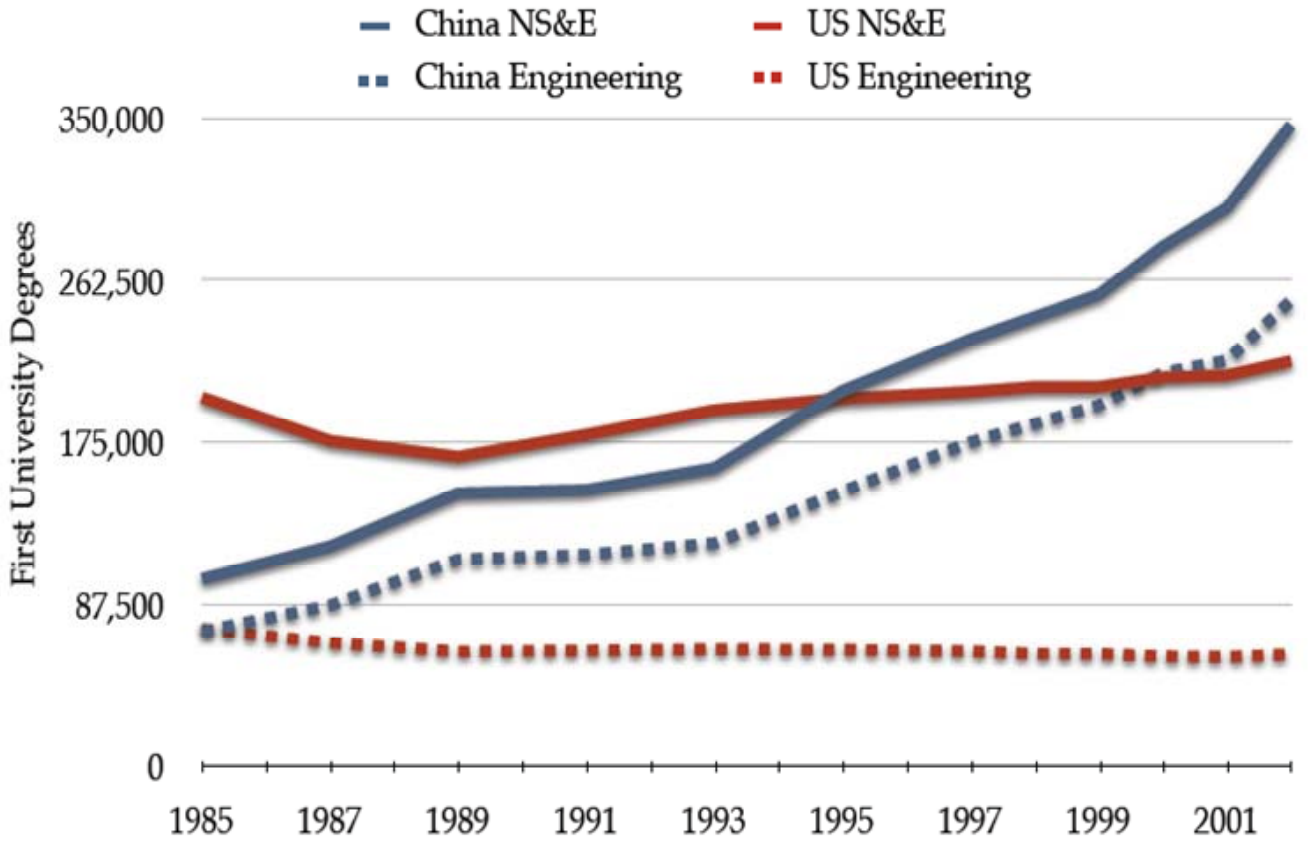
The real question before us today is, will *we* do it right in the next century?

U.S. Advanced Technology Trade Deficit Deepens



Source: U.S. Census Bureau Foreign Trade Statistics, *U.S. International Trade in Goods and Services.*
Compiled by the APS Washington Office.
* Constant Chain-weighted 2000 Dollars

Undergraduate Natural Science and Engineering* Degrees: China on Rapid Ascent; U.S. Stagnant



* NS&E degrees include natural (physical, biological, earth, atmospheric, and ocean sciences), agricultural, and computer sciences, mathematics and engineering. Missing U.S. 1999 data approximated by 1998 data.

Compiled by the APS Washington Office.

Source: *2004* and *2006 Science and Engineering Indicators*, National Science Foundation