

REMARKS BY GEORGIA TECH PRESIDENT G. WAYNE CLOUGH  
Marietta Rotary Club, February 9, 2001

It is great to be here with my fellow Rotarians, and I am pleased to bring you greetings from the Downtown Atlanta Rotary Club.

I also want to thank you for being a home to Georgia Tech. Everyone thinks of Georgia Tech as being in downtown Atlanta, and that is where most of our academic and research programs are located. But we have 199 faculty and staff hard at work in a large research facility here in Marietta. Much of their work is defense related in conjunction with Dobbins Air Force Base and Lockheed Martin, so ordinary mortals like us aren't permitted to know about it. But they also work on other exciting projects. For example:

- Georgia Tech's Severe Storms Research Center is located here. The center is now testing new tornado detection technology designed to give area residents advanced warning that a tornado is at hand.
- High-tech systems designed to save millions of dollars in maintenance on the Navy's P-3 Orion aircraft, can be adapted to fleets of transit buses and trains.
- Jet-plane aerodynamics are being adapted for large trucks, to make them more energy-efficient and give drivers better control.
- Researchers here developed curtains for hospitals or nursing homes that block sound as well as providing privacy.
- A flashlight-sized device that detects a live human on the other side of a door or a wall will be useful not only for police on the trail of a criminal, but also to detect survivors in the rubble of an earthquake or other disaster.

As you can see, Georgia Tech is developing a lot of exciting technology right here in Marietta.

I don't know about the Marietta Club, but downtown the hot topic of conversation is the economy. This "new economy" has once again impressed us with how fast it moves, only this time it dropped like a stone. As Americans opened their heating bills and their statements from their mutual funds and stock market accounts, they gave a collective gasp and grabbed hold of their wallets. Or as economists would say, we have erosion in consumer confidence.

The Federal Reserve Board cut interest rates twice last month – the first time the rate has been cut by a full percentage point in one month in more than a decade. Alan Greenspan told Congress that economic growth had slowed to virtually nothing, and reports of manufacturing activity for January confirmed his statement.

For many people, this economic slow-down raises questions of where we are headed. Do we really have a “new economy”? Or were dot-coms just a passing fancy, a blip on the screen so to speak, and now we are going back to the way it was before?

Well, dot-com stocks were clearly overvalued. But that doesn't mean that information technology is not changing the way we do business. Stanford University economics professor Robert E. Hall says that the bursting of the dot-com bubble was not caused by the realization that information technology has no real economic value, but rather by the realization that funky little Internet start-up companies are not the only ones who can put information technology to productive use. One of the factors that drove the recent economic boom was large traditional industries investing in new technology.

There is a saying that nothing focuses the mind like the sight of a hangman's noose, and now, with the economy slowing, companies are focusing on how to get maximum benefit from their new technology by using it to cut costs. We are early in the process, but there are clear signs that information technology can indeed improve productivity. Our recent productivity growth has been related to information technology, and worldwide data indicate that in general nations with a higher usage of IT experience higher productivity growth. Last November, the Brookings Institute released a report indicating that once it reaches its full potential, the Internet could save American businesses as much as \$200 billion a year.

The economics textbooks in the Ivan Allen College at Georgia Tech define the ideal market as large numbers of buyers and sellers interacting with the advantage of total information. The Internet moves us closer to that description by making a lot more information easily accessible to everyone and broadening the reach of markets. It not only brings market pressure to bear in making companies more efficient, but it is also a tool that companies can use to achieve that higher level of efficiency.

Information technology and the Internet allow businesses to streamline and reduce the cost of a whole host of transactions, from ordering to invoicing. In manufacturing industries, IT is improving productivity from product development to supply chain management, from shipping logistics to the instant communication of changing customer preferences. Even traditional sectors like government, banking, and health care can use IT to make a wide range of mundane transactions more efficient. Putting public information on the Internet, for example, reduces number of government employees needed to answer letters and phone calls.

However, if the United States is to maintain its position of world economic leadership, there are several underlying, longer-term problems that must be addressed. There are

two bedrock essentials on which our future economic strength depends: innovation and a skilled workforce. The United States has done well in both of these in the past, but both of them are in a state of decline today, and other nations around the world are gaining on us. If we continue to neglect these two essentials, then it will not matter what we decide about issues like trade agreements or tax cuts – we will lose our economic edge.

In today's economy, new ideas generate growth. The winners are those who discover new knowledge and apply it to the creation of new technology. But at the very time that new knowledge is more essential than ever to our economic strength, the United States is devoting less and less of our national resources to research. We now spend less of our gross domestic product for research than we did in 1985.

Now that the Cold War is over, health problems are the only sure bet, and we have dramatically increased our research funding for the life sciences. We've also provided a small increase for computing. But research funds for other critical fields like engineering, math, physics, and chemistry have declined. In contrast, many of the industrialized nations with whom we compete, have been increasing their research expenditures. As a result, we are seeing our lead dwindle away in measures like the number of new patents awarded or the number of scientific articles announcing ground-breaking research.

We have also seen a shift in research funding from the federal government to private industry. The government's share of our national research portfolio has decreased from 46 percent in 1985 to 27 percent in 1999, while industry's share has increased proportionately.

The problem with this shift is that private industrial research focuses on the short-term development of marketable products, while the federal government supports the fundamental, frontier research on which industrial research is based. Three-quarters of the patent applications filed by private industry cite fundamental research funded by the federal government as the basis for their inventions. Today's semiconductors were made possible by federally funded frontier research in quantum mechanics conducted during the 1940s. Today's World Wide Web was made possible because the federal government funded basic packet-switching research in the 1960s. Today we are enjoying the harvest from the fundamental research of prior decades, but we are not fulfilling our responsibility to develop and plant the seed corn that the next generation will need to maintain America's economic leadership.

A healthy economy for the 21<sup>st</sup> century must also have talent at two levels: First, a strong cadre of researchers in fields like science, math, computing, and engineering who generate new ideas and innovations. And second, a broad pool of skilled workers who can make something, literally, of those innovations and ideas. But the United States is slipping on both counts.

In 1985 we were first in the world in the percentage of our workforce that was engaged in research. Today we are third, and more than a half-dozen nations are gaining on us, as they increase their research workforce faster than we are increasing ours. Switzerland and Japan have now matched our per capita capacity for innovation. The only way we are maintaining our leadership is by being a lot bigger than they are.

The number of Americans earning Ph.D.s in fields like science, engineering, and computing, is also falling behind. Forty percent of the Ph.D.s the United States awards in science and engineering go to international students. We didn't used to mind that so much, because many of them stayed here to teach and work. But as other nations around the world begin to rival the United States, Ph.D. students have more incentive and opportunity to return home after they graduate.

We also have problems at the second, broader level of our workforce. The Department of Labor predicts that jobs requiring education in science, engineering, and technology will increase by 51 percent during this decade – four times faster than overall job growth. But we are experiencing a decline in the number of bachelor's degrees earned in critical fields like science, engineering, math, and computer science. Most European countries have increased their production of scientists and engineers, and as a result, the United States has dropped to 10<sup>th</sup> in the world in the percentage of 24-year-olds who hold bachelor's degrees in engineering or science.

So, what can we do to turn things around? Georgia Tech is very active in Washington, encouraging Congress and the President to increase funding for the fundamental frontier research that will keep our economy strong. But we are also working here at home to make our state strong.

Studies show that innovation occurs in places where you have strong universities and healthy industry clusters. So Georgia Tech is working with our partner universities and the Metro Chamber of Commerce to make the Atlanta area a dynamic community that generates innovation. We were involved in a major study by the National Council on Competitiveness of Atlanta as a cluster center of innovation, and we will soon have the results of that study to help us in this task.

Georgia Tech is also the nation's largest producer of engineers – we graduate more than 2,000 a year. And Georgia is one of the very few states that have bucked the national trend by actually increasing our production of engineers over the past decade. We have had strong enrollment growth at Georgia Tech, and Southern Tech here in Marietta as well as Mercer University in Macon are also helping to expand Georgia's technological workforce.

We also continue to expand our research endeavors. Last year was Georgia Tech's sixth consecutive year of growth. We now rank second in the nation in the amount of engineering research we conduct, and we are positioning ourselves to receive a significant share of the federal funds that are available for fundamental frontier research in science and engineering.

At the same time, we are also doing more research to serve the immediate needs of industry as it develops new technology. Georgia Tech ranks fourth in the nation in the volume of research we do with private industry, and our Advanced Technology Development Center is both the oldest and the best high-tech business incubator in the nation. These efforts explain why we were voted number one in the nation in technology transfer and economic development.

We also help industries of all kinds to become more productive. Our Economic Development Institute has 18 offices around the state to help companies with everything from becoming more energy efficient to reorganizing their workflow patterns. These offices also help local communities develop and implement economic development plans.

All of these things – educating a technological workforce, conducting leading edge research, translating that research into marketable technology, and helping Georgia companies stay competitive – are ways that Georgia Tech is doing our part to make our state a source of innovation and a center of economic strength.

Georgia's economic growth over the past decade has been robust. We significantly outpaced the nation in population growth, employment growth, and growth of per capita income. And even though we are now experiencing a down-turn, we believe that this state has not yet achieved our full economic potential or realized our full economic strength. At Georgia Tech, we want to help Georgia capitalize on its opportunities and utilize its resources with an eye to the future. If Georgia continues through the 21<sup>st</sup> century on the leading economic edge, then Georgia Tech will have realized our mission and achieved our potential.