REMARKS BY GEORGIA TECH PRESIDENT G. WAYNE CLOUGH
Huntsville, Alabama Rotary Club, July 20, 1999

It is a pleasure to be here with my fellow Rotarians in the high-tech capital of Alabama.

Georgia Tech always has a strong contingent of students from Alabama. We had 220 of them on campus this past school year, which is pretty good considering that Alabama has seven engineering schools of its own. We also send a significant number of alumni to Alabama, and to this community in particular. There are over 900 Tech alumni in and around Huntsville and northern Alabama.

Georgia and Alabama are next-door neighbors in the most economically vibrant region of the country. Sixty years ago, Franklin Roosevelt called the South the nation’s number one economic problem. Today, the respected British magazine The Economist calls the South “the locomotive powering the American economy.”

The South has been the nation’s fastest growing region during the 1990s. During this decade, over half of the new jobs in the nation were created here in the South. Job growth in both Georgia and Alabama outstripped the national rate. Per capita income in both of our states has grown faster than the national average.

The South has about a third of the nation’s colleges and universities, but over the past decade, we have accounted for more than half of the nation’s enrollment growth. And growth in the number of college degrees we are awarding has outpaced the nation’s at every level – bachelor’s to Ph.D.

This is not to imply that the national economic picture is weak. The South stands out as the high point of a national economy that is robust all around. We approach the new millennium with our national economy riding high. And while we’ve been enjoying economic vigor, our primary international competitors – Japan, the Pacific Rim and Germany – have been slowed by economic difficulties. So who is going to stop us?

Well, in the words of that great American philosopher Pogo, “We have met the enemy and the enemy is us.” The greatest threat to our ongoing success and prosperity is our own complacency.

Historically, the United States has been the innovator while the rest of the world was the imitator. We made new discoveries, thought up new ideas, explored new fields; and the rest of the world copied us.

Many of our inventions were driven by the Cold War. The Space Race that spawned NASA was part of this picture. The Department of Defense funded basic research with the purpose of producing military innovations. And it did. But it also gave us weather and communications satellites, passenger jets, robotics, remote sensing technologies, supercomputing and the Internet, to name a few.
For 40 years following World War II, Defense Department research drove a wide variety of innovations in fields like aerospace, electronics and communications. The knowledge accumulated during those 40 years still drives our success and prosperity today.

But it is about to run out. Spending for defense-related research has been declining since the end of the Cold War, and in the process we are losing the innovation it brought to important commercial fields. Federal spending for other kinds of research is also on the decline, squeezed like a lemon at a country fair by budget reform. Between 1993 and 1995, federal research spending fell by 12 percent.

The outlook for the next five years is more of the same. Overall federal spending for research and development is projected to decline by 13.4 percent in real dollars, with defense spending expected to drop by 14.3 percent, while other research funds decline by 12.4 percent. NASA is projected to take a 14.8 percent cut, adjusted for inflation.

In the meantime, other nations are beginning to make the transition from imitators of American discoveries to innovators in their own right. Research and development have begun to follow manufacturing overseas. Believe it or not, countries like Ireland, Israel and even India are the latest sites for software investment.

This whole process of other countries emerging to compete with the United States as innovators, has been escalated by the speed with which technology is changing. IBM has recently begun to measure the life of its products in “web months.” One web month is equal to three calendar months. That’s four potential product cycles just in the course of one year.

When technology changes this quickly, there are a lot more openings for something new or somebody new to get a foot in the door. Innovation becomes very competitive. We are cutting federal research dollars at the very time we need to be faster about innovating than we were in the past and faster than everybody else around the world.

Private industry is also growing more reluctant to support the basic research that generates innovation. As competition in the global marketplace becomes increasingly keen, companies want their research dollars to translate into product lines. And basic research can’t promise that. Basic research is like wandering around in the wilderness. The point is to discover what’s out there. To those who are driven by the bottom line, basic research often looks a little odd.

For example, take Bill Ditto at Georgia Tech, who works in an unusual space between biology, engineering and mathematics. He connects living nerve cells of large leeches to silicon computer circuits, then uses the principles of an exotic branch of mathematics called chaos theory to sort through the chatterbox of electronic traffic that results. Now what company is going to sponsor research like that?

But what he has discovered is that the leech nerve cells can do arithmetic when prompted by the computer circuits. It’s a discovery with potential in both directions. On the computing side of the equation, it contributes to the creation of a “bio-computer” that lives up to its historic hype as a machine that can actually think.
On the biological side, it contributes to the use of artificial nerve cells to bridge spinal cord injuries and control nervous disorders. Next Bill wants to hook up leech nerve cells to video cameras and microphones to explore ways that technology can help people whose senses are impaired. So you can see that a basic research idea that might sound kind of off the wall, can turn out to have a number of practical implications.

This is just one example of the many connections between technology and science that basic research is exploring today. And some of them are turning out to be economically productive. The rapid pace of innovation has shortened the time it takes a research discovery to be commercialized in the form of a marketable product, and research has become a driving engine for economic development.

Companies are being formed today in areas that barely existed only a few years ago. Electronic commerce has emerged rather suddenly and spun off in 100 different directions and applications with a speed that takes our breath away.

Biology has joined physics, chemistry and math as the fourth science to merge with engineering, and new products are emerging. For example, Georgia Tech is incubating a start-up company that has developed an artificial biomaterial that merges well with the human body. It can be produced in a variety of forms from synthetic arteries to synthetic cartilage.

The challenge for American research universities is figure out how to press ahead with research like this at a time when federal funds are dwindling. In Georgia, the state has stepped in as a player. State government has invested $240 million in the Georgia Research Alliance, which promotes and coordinates research among six research universities, including Georgia Tech, and private industry. It focuses on three cutting edge fields – biotechnology, environmental technology and telecommunications.

The board of the Research Alliance is made of the presidents of the six participating universities plus CEOs from Georgia’s leading high-tech industries. It keeps a hand on the pulse of economists, military planners and government scientists, to sense the technology directions and needs of the future. Then it chooses research projects to support. Some of them are economically promising in the short-term, but others will take as long as 20 years to generate tangible jobs. It is a calculated risk that Georgia has been willing to take to generate the innovation that drives high-tech economic development.

The $240 million in state funding for the Research Alliance has become a seed investment that helps to hire internationally renowned research scholars and equips their labs. The high quality of the researchers and labs has enabled us to attract $500 million in federal research funds and $50 million from private industry.

Private industry supports the Research Alliance not only because they get to help choose projects, but also because the Alliance works to commercialize research discoveries. State funds incubate new start-ups and help with venture capital, patents and licenses. So the Research Alliance is a direct investment in high-tech economic development as well as in research.
In addition to innovation, a thriving high-tech economy requires an educated workforce. It is clear that the future will rely more than ever on the talents and skills of engineers, scientists and technologically trained workers. And the competition is just as keen for skilled workers as it is for innovation.

We are now in what some call a “talent war,” and the signs are everywhere. Even the nation’s premier technology community, Silicon Valley, has sounded a warning that it cannot get enough engineers and scientists to do the work that is waiting to be done.

Education has always been more of a state issue than a federal issue, so this is another opportunity for states to take the initiative. In Georgia, we see education as an economic development tool that goes hand in hand with research.

One of the hottest fields in today’s high-tech economy is information technology. In 1997 – just one year – the information technology industry created 350,000 jobs. The Commerce Department projects that by 2006 almost half of the U.S. job force will be either producers or intensive users of information technology.

Georgia wants to get our share of this electronic revolution. We want to attract and home-grow the companies that will produce the electronics, computing, telecommunications and entertainment technology of the future.

This little device I have in my hand is an example of what I’m talking about. It is about the size of a half-dollar, but it holds 350 megabytes of data. A newer version will be out shortly that will hold a gigabyte. It was just five years ago that IBM first came out with a PC that had a one-gigabyte drive. It weighed 22 pounds. You will soon be plugging these little storage devices into computers, palm pilots, cameras and all kinds of other products that have microchips.

To attract and home-grow companies that invent products like this, the state of Georgia created what we call the Yamacraw Mission, named for the Yamacraw Bluff along the Savannah River where the first Georgia pioneers settled in 1734.

The most essential ingredient in attracting these leading-edge electronics companies is a skilled workforce. So Yamacraw will educate computer and electronic design engineers, who will be able to make the intelligent devices that will underlie the electronic products of the future. Georgia Tech is the lead educational institution in Yamacraw, and we are gearing up to graduate 2,000 design engineers a year by the year 2004.

The Georgia Research Alliance and the Yamacraw Mission reflect our belief that higher education has become the most important economic development infrastructure a state can have. A few months ago US News & World Report named Georgia Tech’s School of Engineering third best in the nation behind only MIT and Stanford. That means more to us than just a reputation we can be proud of, although we are. It is also an expression of our commitment to educating the quality workforce and conducting the quality research that will drive Georgia forward.
We don’t want to look back on the 90s as the decade when Georgia and the South hit the peak of our economic strength, and then with the new century dwindled away into an economic backwater again. We want to look back and remember this as a time when we got even better at capitalizing on our opportunities and utilizing our resources with an eye to the future, so that we moved into the 21st century on the leading economic edge. If Georgia Tech can help Georgia and the South to do that, then we will have achieved our potential.