

“Global innovation and the Importance of R&D”  
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Opening of GTRI Ireland, June 21, 2006

It is a great pleasure to be here with you and participate in the Grand Opening celebration of GTRI Ireland. The Georgia Tech Research Institute has research centers in eight different American states, but this is the first to be located outside the United States.

For the past two weeks, my wife Anne and I have been traveling around Ireland with a group of Georgia Tech alumni, admiring the beauty of your country and learning about its history. In the American South, we are proud of our reputation for hospitality, but I think the tradition of hospitality here in Ireland is every bit as broad and deep. We have been welcomed graciously everywhere we have gone and have had a wonderful time enjoying Ireland and learning to know its people.

The state of Georgia has been commemorating its ties to Ireland for almost two centuries through the annual celebration of St. Patrick’s day. The first celebration was a small private affair in the city of Savannah in 1813, but over the years since then it has grown into a large party that lasts for several days and draws a quarter of a million visitors to Savannah. It is the largest event in the southeastern United States, and features the second largest St. Patrick’s Day parade in the nation.

We also share the common heritage of having belonged to England along the way through our history. And we share a common language – although someone listening to your Irish brogue together with our southern drawl, might be inclined to agree with Oscar Wilde that we are two peoples *divided* by a common tongue.

The Irish have given Georgia Tech several wonderfully talented people, including the director of our Georgia Tech campus in Savannah, David Frost, who graduated from Trinity College in Dublin with degrees in mathematics and civil engineering, and Raymond Flannery, a Regents Professor of physics who graduated from St. Columbs College in Derry and got his Ph.D. at Queens University in Belfast.

But today, Georgia Tech and Ireland are united by our focus on the future. Over the past decade, Ireland developed a deliberate strategy that has focused your resources and energies on improving the skills of your workforce, creating a favorable tax climate

for business, and providing broadband Internet access. As a result, hundreds of high-tech companies have flocked to Ireland. And as we traveled across this beautiful country, we saw many of the same names that are so familiar at home: Dell, Microsoft, Gateway, Oracle, Sun Microsystems, H-P, and Apple, to name just a few.

In fact, seven of the world's top ten IT companies are in Ireland, where together they employ 45,000 people. And a third of the personal computers sold in Europe are made here in Ireland. Ireland has also become the launching pad for younger, smaller American companies looking to break into the European market. You are a great place from which to make a smooth transition, because you speak English and use the Euro as your currency.

But Ireland also has a growing community of your own high-tech start-ups – companies like Vordel and Iona Technologies, whose names and products are starting to become known in the United States. You rank at the top of the EU in having enterprises with innovation activity, and you are increasingly known around the world for embracing technology and for innovation.

Your emphasis on developing your high-tech business sector aligns very well with Georgia Tech's strengths, and we are very excited to join forces with IDA in helping Ireland to help bridge the gap between university research and commercial applications in industry. Back in the United States, Georgia Tech is a national leader in conducting industry-sponsored research, and in translating research discoveries into commercial enterprises. Within the past five years, we have spun off 52 new companies from our research labs – two dozen of them just within the past two years. And we rank among the top ten universities in the United States in the number of patents that are awarded to us. We are home to the first university-based business incubator in the United States, and it continues to win accolades as one of the nation's best. We are looking forward to sharing that expertise with you.

For most of history, scientists and engineers did not work this closely with each other or with the business community. Prior to the 20<sup>th</sup> century, poor communication meant that scientists and inventors worked in isolation, without the benefit of exchanging ideas with others who were working on the same things. When something new was invented, the news of it was slow to travel. Four thousand years went by between the time when the wheel was invented and when it was put to use in the first wheelbarrow. It took another century to get from the wheelbarrow to the four-wheeled wagon. The first battery to store electrical energy was invented in 1796, but 50 years later, only a handful of scientists knew that it existed.

Today, information moves around the globe at the speed of light by satellite and fiberoptic cables, and the Internet tells us more than we ever wanted to know. Last year we celebrated the 10<sup>th</sup> anniversary of the commercial Internet, which was launched on April 30, 1995, when a computer network that had been developed by U.S. universities and the American government was opened up to the general public. That network quickly spanned the globe, and over the course of the past decade, 600 billion web-pages have been created – 100 for every living person on Earth.

As communication, transportation, and logistical technologies have grown faster and more powerful, they have been weaving all of us closer together, connecting people all around the world in new and profound ways. Of course, the United States is interested in protecting and furthering its own national interests and promoting its own economic advantage – just as Ireland wants to further your own national interests and promote your own economic advantage. But the economy in which we now function is global, and we are discovering that it is now in our national interests to collaborate internationally in a global arena.

Back in the 20<sup>th</sup> century, we Americans used to say, “As General Motors goes, so goes America,” reflecting the importance of major national corporations to our economic well-being as a nation. Today, it would be accurate to say, “As H-P goes, so goes the world.” Over the past 30 years or so, the number of multi-national companies has not only increased nine-fold, but the definition of a multi-national company has changed. As the GM expression indicated, we used to think of multi-national corporations as big American companies with foreign branches or subsidiaries, but that is no longer true. Of the 500 largest multi-nationals, only 185 – less than 40 percent – are headquartered in the United States. And today’s multi-national corporations are truly global, taking a sophisticated approach that acknowledges nuances within a country and engages local citizens in the full range of activities within the company.

We have also seen trade increase dramatically. During the second half of the 20<sup>th</sup> century, the value of world production increased six-fold, but the value of world exports increased 19-fold. And the global economy never sleeps. IBM squeezes 32 hours of writing Java software into a 24-hour day by relaying the work around the globe in tandem with the time zones, from United States to Latvia to India to China and round to the United States again for the start of the next workday. The stock exchanges of nations around the world are increasingly interconnected, so that transactions that can affect all of us are underway somewhere in the world 24 hours a day.

The global economy has also emerged at a time in world history when we are facing unprecedented challenges. Six years ago, the world population surpassed 6 billion. It

took all of world history until the early part of the 1800s for the population to reach 1 billion people. The second billion took nearly a century after that. But the most recent billion was accomplished in about 12 years. Fortunately, the birth rate has begun to slow, and the next billion is expected to take 14 years instead of 12.

However, before it peaks, the world's population will reach 10 billion people – which is almost 4 billion more people than are alive today. How will we feed them all? Where will we find enough clean, fresh water? Water tables are falling in China, the United States, and India, which together produce half of the world's food. By the year 2025, 3 billion of the world's people will live in places where fresh water resources have fallen below sustainability levels.

In addition to become more populous, the world is also becoming more industrialized. As a result, we face the dual problems of increasing energy demands and increasing pollution. The United States is the number one importer of fossil fuels, and we are learning that it is no longer practical for any nation to be overly reliant on any one fuel source. We must diversify into other energy sources, including greater use of renewable resources. And that is a subject of interest for Ireland as well.

Rising to meet these challenges requires research and innovation, and they are problems which we must solve if we shape a healthier, more prosperous future for all of the Earth's inhabitants.

The Industrial Development Agency of Ireland and Georgia Tech share an important common goal, which is to support the economic development goals of our respective regions. To stay ahead of the game in the global economy in which we both must compete, our respective regions must become more innovative. No nation, no region, no community, no business can compete against hungrier, global competitors using the same old status quo approaches. The trick is to cultivate the kinds of research, workforce skills, industries, government policies, and business climate that are not offered elsewhere. And that requires us to be on the leading edge of innovation.

I recently had the privilege of co-chairing the National Innovation Initiative of the U.S. Council on Competitiveness, together with the CEO of IBM, Sam Palmisano. The Council on Competitiveness defines Innovation as I<sup>5</sup> – or the intersection of five I's: ideas, imagination, invention, insight, and implementation. Innovation begins with research in science and engineering to generate new discoveries and new inventions. But, unlike the scientists and inventors of bygone days who worked in isolation, innovation is a social activity that emerges from conversation and collaboration. This collaboration and conversation are what provide the ideas and insight that enables

discoveries and inventions to be used to solve problems, address the needs of society, meet market demand, and even create new markets.

Universities conduct most of the fundamental research that generates the new discoveries and new technologies that are the starting point of innovation. In the process, it is important for us to encourage interactions among faculty and students that enable them to piece together their ideas, knowledge, and inventions in unique ways. These conversations and collaborations are often the most productive when they are carried out across the traditional academic disciplines. The hotbeds of discovery and innovation today are in fields like nanotechnology, logistics, biotechnology, optics, and photonics, which combine traditional academic disciplines in science and engineering.

The cross-disciplinary nature of innovation is reflected in the four areas in which Georgia Tech and IDA will work together. At Georgia Tech, digital media is a collaborative effort between our College of Computing and our Ivan Allen College of Liberal Arts. Our work in radio frequency identification brings together scientists with chemical and electrical engineers. Georgia Tech's Strategic Energy Initiative involves mechanical engineers, electrical engineers, chemical engineers, civil and environmental engineers, chemists, and physicists.

Our biomedical engineering program is a collaborative effort not only among science, engineering, and medicine, but also between Georgia Tech, which has one of the world's best engineering programs, and Emory University, which has an outstanding medical school. Our two universities work hand-in-hand in the only full-fledged partnership between a public and a private university in the United States.

We also engage in conversation and collaboration across national boundaries. When I leave Athelone later today, I will head for France, where Georgia Tech has had a campus for more than 15 years, educating European students and conducting research and development activities. We also have a research and education platform in Singapore, and dual degree programs with the Technical University of Munich, the Technical Institute of Monterrey in Mexico, and Shanghai Jiao Tong University.

In addition, Georgia Tech faculty collaborate on research projects with faculty in literally dozens of other countries, including Ireland. Faculty at our Petit Institute for Bioengineering and Bioscience and our National Center of Excellence for the Engineering of Living Tissues collaborate with researchers at the Regenerative Medicine Institute at the National University of Ireland in Galway. Tim O'Brien, who is the director of the Regenerative Medicine Institute, will be speaking later this morning, and

we were honored to have Frank Barry from RMI as a speaker at a tissue engineering workshop we hosted in Georgia about a year ago.

Dermot Diamond of Dublin City University, who is on the program this afternoon, collaborates with Georgia Tech faculty in our School of Chemistry on new technology for sensors. Georgia Tech faculty in the field of photonics are working with faculty from Trinity College. Sam Shelton, who directs Georgia Tech's Strategic Energy Initiative, is in conversation with faculty at the University of Cork, and we have research partnerships with faculty at the University of Limerick as well.

In addition to building international research partnerships, we also educate our students to be citizens of the world. We work to give them a higher level of sensitivity to diversity and cultural differences, a greater ability to work across cultures, and an appreciation for differences in the way business is conducted around the world. At Georgia Tech, one third of our students study abroad or do an international internship. If you study a language, take courses in international affairs and global economics, do two study abroad terms, and do a special project that connects these international experiences with your major field of study – then you get a special designation on your diploma

Going the other direction, we welcome many international students to our Atlanta campus. This year we had almost 2,900 international students, which is 17 percent of our enrollment, including several undergraduates from Ireland. These cross-cultural experiences give our students the international perspective they need to be successful citizens of the world.

*New York Times* writer Thomas Friedman recently wrote a book entitled *The World is Flat: a Brief History of the Twenty-first Century*. It is a best seller in the United States. The title recalls the ancient days of earliest world trade, hundreds of years ago, when it was a common misperception that the world was flat, and anyone who sailed too far out to sea would fall off the edge. Then the 16<sup>th</sup> century launched an era of global exploration that proved not only that the Earth was round, but also documented the continents it contained. And everyone had to revise their understanding of the world.

As the title of Tom Friedman's book suggests, we are once again at a time in history when we are revising our understanding of the world. When Friedman says today's world is flat, what he is actually describing is the leveling of the global economic playing field. A vast web of information technologies now interconnects the world, and anyone with a computer and Internet access can be an instant player in the global economy.

A number of nations around the world are investing in research in science and technology and developing world-class research universities. The research that drives innovation and the skilled workers who can translate it into products and services are increasingly spread around the world rather than concentrated in only a few places. Markets for leading-edge technology and the companies that make it are also increasingly spread around the world rather than concentrated in just a few places.

But Richard Florida goes a step farther, pointing out that while the global playing field is being leveled, the economic terrain of the 21<sup>st</sup> century will actually be “spiky.” The spikes will be centered in locations that have well-educated workforces and world-class research universities – places with an entrepreneurial mindset and a business climate that offers companies the opportunity to be nimble and flexible.

You are working very deliberately to make Ireland competitive in the “flat-world” environment, so that you have an opportunity to emerge as one of those spikes of innovation. Georgia Tech is also focused on becoming a spike of innovation, and when these spikes of innovation begin to converse with each other and collaborate together, then their ability to realize and drive positive change is magnified.

Becoming a spike of innovation will turn a location into a leader, both in the global economy and in the process of solving the challenging problems facing our world today. At its core, to be focused on innovation is to be engaged in a dynamic search for imaginative new ways to cure disease, to develop new environmentally friendly energy sources, to assure plentiful supplies of fresh water, and to improve the quality of life for all of the people and creatures that inhabit our world.

Georgia Tech is working hard to be one of those truly global research universities that are on the leading edge of innovation, and that collaborate with others around the world to drive innovation. We are very excited to begin a partnership with the IDA of Ireland that we believe will be mutually beneficial and will help to stimulate innovation both here in Ireland and back home in Georgia.