Good afternoon. As president of Georgia Tech it is my honor to present this annual report to you on the State of the Institute. As always, Tech has seen many exciting accomplishments, events, and achievements during the past year, and I cannot cover them all in this talk. So we put some of the highlights of the year into this little brochure, which complements my talk today. And I encourage you to read it.

In another time, universities were referred to as “Ivory Towers,” a phrase that implied they were insulated from the swirling affairs of the world and nations, and faculty and students focused on issues of little relevance to society. Events have changed this circumstance, and today universities exist in a time when they are expected to be engaged in the currents and events that are important to life and well being. As the quote says, “the emerging global university is set to be one of the transformative institutions of the current era.” Yet we also know that certain elements of the university of the past are fundamental to our identity and need to be sustained, and that change for change’s sake is not in our best interest.

Those universities that learn how to deal with these countervailing roles, and even turn them to an advantage, will have the edge going forward in possibilities for innovation, intellectual growth, and knowledge creation. I believe Georgia Tech is becoming such a university and this is creating a new value proposition for our students, staff, faculty and our stakeholders.

Georgia Tech’s mission statement from our 2002 strategic plan calls for us to “define the technological university of the twenty-first century.” This is a bold assertion, and we have been working steadily towards this goal over the past several years. The phrase “define the technological university of the 21st century” recognizes that what succeeded in the past is not necessarily relevant to the future, and that we are going to help define the path forward by being at the forefront ourselves. Few institutions have taken on this high purpose. Few have had this opportunity.

Our plans are being launched just as education, research, and innovation have become the pillars of prosperity and productivity. At the same time, our world faces growing global problems from clean water to greenhouses gases that cry out for technological solutions, and society is increasingly looking to us to help face the challenges and maintain a positive standard of living. We undertake our vision within a context of high expectations, and we owe it to those who depend on us to achieve our mission well.

While we have given ourselves the entire 21st century to define the research university, it is appropriate for us to take stock of where we are. Indeed, it is useful to reflect on our progress to see whether it is shaping the future we are hoping for.
One measure of our early results is to ask if we are making good choices. To this end, it is useful to appreciate the emerging priorities of the federal government and the business community. In this year’s State of the Union address, President Bush announced the U.S. Competitiveness Initiative, which calls for increased support for engineering and physical science research as well as for the study of these fields by our country’s young people. In concert with this initiative, a range of federal agencies have placed a strong emphasis on new research in areas like energy, nanotechnology, nanomedicine, materials, and disaster recovery by a range of federal agencies. Beyond the federal government in the business sector, we see a rapid growth in interest in areas like sustainability, water, and photonics. Consistently, all of these show a strong overlap with the choices we have made for our investments.

Our growing strengths and areas of expertise are coming into alignment with the pressing needs of our nation and the world. From energy to nanotechnology, from innovation to technology transfer, I believe Georgia Tech has chosen well.

Many of the opportunities for exploration lie in the cracks between the traditional academic disciplines, and this is a space in which Georgia Tech excels. As new fields emerge in these spaces, Georgia Tech is able to run out on the cusp of their development.

Here are just two illustrations of centers formed during the past year to take advantage of emerging opportunities in interdisciplinary fields. Jeff Skolnick, who is a world-renowned scientist, came to Georgia Tech and brought 19 colleagues with him to start the Center for the Study of Systems Biology. Their goal is to develop novel approaches to the development of drugs and pathway engineering for their delivery. The outcome of their work will be new approaches to the diagnosis and treatment of diseases like cancer.

The Center for Biologically Inspired Design was begun on the premise that the evolution of every living thing is Nature’s solution to a particular problem set, and the direction and patterns of that evolution can provide clues to the solution of complex engineering problems. Nature’s designs tend to be efficient, practical, and sustainable, and those are characteristics that are worth emulating.

The Music Department represents another space in which Georgia Tech is much edgier than the typical college program. The robotic drummer shown here may not be much to look at, but it is more sophisticated than a human drummer because its computerized brain enables it to play a different complex rhythm with each hand. Artificial intelligence allows it to recognize the patterns of others’ rhythms in real time, adjust to them, and elaborate on them. And pretty soon it starts leading the music in new directions. It is a force to reckon with in any jam session.

Similarly, the School of Literature, Culture, and Communication in the Ivan Allen College has joined forces with the College of Computing to move out on the edge of digital media, with the result that Georgia Tech was just named one of the top ten digital gaming institutions in the nation.

Being creative about forming partnerships is one of the keys to success in the new environment. Our most significant partnership with another institution is with Emory University. Begun
through informal research relationships between faculty more than 20 years ago, the Georgia Tech-Emory partnership has grown into one of the leading bioengineering and biomedical programs in the nation. Georgia Tech and Emory have also emerged as national leaders in the application of nanotechnology to medicine. We are now among the top institutions in attracting nanomedicine funding from the National Institutes of Health, and we have secured three national centers of excellence in nanomedicine. A decade ago, the idea of Georgia Tech leading the way in anything to do with medicine would have been unimaginable, but through innovative partnerships, like that with Emory and other universities, we have shifted the paradigm.

Not all of the nanomedicine collaborations are with our neighboring institution across town. Long-time Georgia Tech Chemistry Professor Mostafa El-Sayed is collaborating with his son, a professor at the University of California, San Francisco, in groundbreaking research using nanorods made of gold. The gold nanorods illuminate cancer cells so they can be seen with imaging technology, and in the process the cells are weakened, which allows them to be destroyed by lasers that are low enough in power to avoid damaging surrounding tissues.

Georgia Tech is also developing strong, well-grounded global partnerships. Georgia Tech Lorraine is our oldest and most well developed international platform. Begun as a graduate education program more than 15 years ago, it is now expanding into undergraduate education and is building a residence hall. The research program has also grown, developing partnerships with other European universities and research institutions. The most recent of these is our second partnership with the French National Center for Scientific Research. Directed by a Georgia Tech faculty member at GT Lorraine, this center is focused on telecommunications and new materials.

Our growing international profile also opens doors of opportunity to partner with global corporations like Solvay.

The Georgia Tech Research Institute, which is our applied research arm, is also extending its reach. GTRI, which already has research centers in a dozen locations around the United States, opened its first international center in Ireland in June. Working in collaboration with the Irish Industrial Development Agency, GT Ireland will focus on digital media, radio frequency identification, biotechnology, and energy. The center expects to build a research staff of 50 and a portfolio of about $25 million over the next five years.

Heading the opposite direction from campus, I traveled to China last winter with a delegation from Georgia Tech to visit Shanghai Jiao Tong University and sign an agreement with them to offer dual degrees. We already have a successful student exchange program, and I expect that our relationship will continue to expand in the future.

While some of Georgia Tech’s research is as new as nanomedicine, other projects focus on problems that have been around for a long time and keep resurfacing in new forms, energy being one of those. Georgia Tech has been exploring alternative energy sources for many years. More than 10 years ago, we installed what was then the largest grid of solar cells in the world on the roof of what is now the Campus Rec Center. Through the years, we have been awarded national centers of excellence in photovoltaics and organic photonics. Georgia Tech also has established programs in nuclear energy and electrical energy, and in battery and fuel cell technologies. More
recently, we have expanded our efforts to develop commercially viable biofuels and developed the Strategic Energy Initiative to pull the pieces together and bring alternative energy technologies into the marketplace. Tech researchers also have creative ideas for new energy applications like the unmanned aerial vehicle pictured here, which is powered by hydrogen fuel cells.

Robotics is another field in which the considerable expertise Georgia Tech has developed puts us in a position of leadership just as the field is set for strong growth in a wide range of practical applications. Robotics industry associations in North America and Japan are expecting the global market to expand significantly in the next five years. As a result RIM – the Robotics and Intelligent Machines Center – was created to promote collaboration across the various faculty and academic units that work in robotics – from the College of Computing to the Woodruff School of Mechanical Engineering – and speed the transfer of new technology to industry.

The growth of cutting-edge research at Georgia Tech reflects the conclusion of a recent study by College of Management Professor Marie Thursby together with her husband who is a professor at Emory. They surveyed CEOs of more than 200 multinational corporations across 15 industries about where they will locate their R&D operations. They found that R&D will continue to be attracted to India and China because of the growing talent base and improving quality of higher education. However, the stronger intellectual property protection offered by advanced countries like the United States will keep the most cutting-edge work here. And that provides an opportunity for Georgia Tech to continue to grow its research enterprise and move out onto the leading edge.

Of course, the technological university of the 21st century does not simply invent new technology and put it on the shelf. And a significant part of Georgia Tech’s entrepreneurial personality is its traditional knack for putting technology to work in creative solutions to practical problems. Our goal is not only to develop new technology, but also to put it to work in sustainable ways to improve the quality of life.

In recent years we have been recognized in several national studies as among the best in technology transfer and commercialization. And soon after we developed VentureLab a few years ago to help faculty commercialize their research discoveries, it became a model that both the Georgia Research Alliance and the University System of Georgia are now trying to emulate. But by the time others began to copy us, we were already taking it to the next level in the Enterprise Innovation Institute, which strengthens our ability to commercialize technology, assist entrepreneurs, and help Georgia’s industries and communities become more innovative.

The most recent acknowledgement of our talent for technology transfer came from the Milken Institute, which examined the process from knowledge creation to early-stage commercialization in biotechnology. The study found that Georgia Tech did very well by several measures, which is no surprise when you consider innovative companies like CardioMEMS, which is developing tiny sensors for the cardiovascular system that take readings from inside the body and sent them to doctors by radio waves. Or Orthonics, which is developing new biomaterials for spinal disc repair and regeneration.
Another field in which Georgia Tech is leading the way in commercialization is clean-tech companies, which bring environmentally sustainable technology to the market. VentureLab is overseeing the development of several new clean-tech companies whose products range from renewable fuels and high-efficiency solar cells to tiny jet-like devices to reduce aircraft fuel consumption.

Being a leader in research and technology transfer is a good thing, but it is only one part of a larger picture that for higher education as a whole, is not all positive. The recent “Spellings Report” from the U.S. Department of Education is critical of American higher education for being self-satisfied and disconnected from the needs of business and society – and for being unduly expensive and inaccessible. Where does Georgia Tech stand? I was privileged to be asked to testify to the Spellings Commission and provided a view of our institution that countered the prevailing perception.

On the matter of affordability, our tuition ranks close to the bottom of our set of 14 public peers around the nation. And our co-op program, the largest voluntary co-op program in the nation, is routinely included in the U.S. News list of “12 Academic Programs to Look For,” because it helps talented young men and women pay for their educational costs while learning about their future careers. This combination of quality and accessibility put us twelfth on latest Kiplinger’s list of 50 best values in public education, just released last month.

But many institutions of higher education can claim to be accessible and affordable. What is harder to do is also to provide our students with access to world class faculty and an innovative educational experience that allows them to achieve at the highest levels. I had the honor of chairing the Engineer of 2020 initiative of the National Academy of Engineering. This quotation represents our vision of the attributes of the Engineer of 2020, and I believe it should be true for every student at Georgia Tech, no matter what their major. It brings into full view the challenges of defining the technological university of the 21st century.

When I was a student here, back when the Earth was still cooling, undergraduate education was a cookie-cutter operation. Each discipline had a fixed body of knowledge that was not necessarily connected to what was going on in the outside world. And the goal was to impart that fixed body of knowledge to students in a process that resembled pouring water into a cup. There was no interest in any deviation from the cookie-cutter model, and there was little recognition of the educational value of the larger university experience.

I am pleased to say that education at Georgia Tech today is dramatically different than that model, largely because we have worked hard to change it over the course of the past decade. Today, undergraduate education is broader, deeper, and richer. It is more flexible and interdisciplinary.

This fall we have begun an Honors Program for outstanding first and second year students who want an intense educational experience that extends beyond the classroom. As we launched this program, we were simultaneously recruiting this year’s freshman class, and we quickly realized that the Honors Program was helping us recruit outstanding students who otherwise would not have chosen to come to Georgia Tech. I met with the Honors Program students and their parents
last week, and came away very impressed with the caliber and energy of these young people. And I realized that we had opened yet another door of opportunity for students to expand their talents and abilities. The Honors Program is brand new, so we will be learning from our early experiences with it and will continue to shape it as we go, but it is off to a very exciting start.

As the world increasingly becomes a global village, we have expanded our study abroad options, and the number of Tech students studying abroad has more than doubled over the past decade. But many American colleges offer a study abroad experience, so what is it that makes Georgia Tech a leader? The answer is that we have taken it to the next level – deepening and enriching the international experiences we offer and increasing their value. We are also tying them more closely to our curricula, and crafting innovative international, interdisciplinary degree programs. This approach maximizes our students’ international experience, elevating them from mere globe trotters to citizens of the world who are prepared to succeed in a global economy.

And we don’t stop there. The international piece is just one component of the new educational paradigm we are crafting at Georgia Tech. Students are also encouraged to engage in structured research activities as a way of stimulating their curiosity, learning teamwork, gaining experience with open-ended problems, and experiencing the excitement of discovering new knowledge.

We have taken student leadership to a new level as well. In addition to the usual leadership opportunities, Georgia Tech now offers a certificate program in leadership through the School of Public Policy. Students take courses dealing with the social, political, cultural, economic, global, and technical dimensions of leadership, and receive training in key theories and skills required for leadership – like teamwork and communication. They conclude by applying their knowledge in an internship.

Our faculty are also changing their curricula. We began almost a decade ago by requiring students to have a computer that met certain specifications and revising our curriculum to incorporate web enhancements. Since then, we have developed a number of innovative new programs, including problem-based learning in the Coulter School of Biomedical Engineering, interdisciplinary degrees at all levels in digital media, interdisciplinary professional master’s degrees based in the College of Sciences, and the TI:GER Program in the College of Management, which involves graduate students in hands-on learning about the commercialization of new technology.

Last year, the College of Computing took a creative approach to redefining its undergraduate program around “threads” and “roles.” This new approach gained an unexpected fan when New York Times columnist and Pulitzer Prize winning author Tom Friedman visited campus and was so impressed he included it in his expanded new edition of The World is Flat.

Students choose two of eight different threads, each of which is focused on an area that engages computing. This approach enables students to both broaden and tailor their education, rather than simply learning standardized, siloed programming skills. At the same time, they imagine their future careers and slant their educational program in the direction of a particular role – whether an entrepreneur or an innovator or a master practitioner. The goal is to put things together
horizontally in ways that make sense and produce graduates who are more than the basic, standard programmers who are available at lower cost in India.

Even as the educational experience changes so do the resources Georgia Tech provides to serve that experience. First came the Library West Commons, which was a meeting of the traditional reference desk and the IT help desk in a $1 million multimedia learning center. Then this fall we opened the Library East Commons, where you can relax with a sandwich and cup of coffee; join with your lab partners to produce a high-tech, color lab report; or record your practice session for a class presentation to a streaming server so that you can run it by the professor and get some advance feedback. I’m still trying to get used to Jazzman’s Café. In my day, a guard at the door prevented you from bringing anything to eat or drink into the library.

This new facility is certainly not the college library of even a decade ago, and it is not even the library you will find on most campuses today. In fact, it is so cutting-edge that when the Association of Research Libraries decided to explore digital roles for libraries last month, this is the only campus they visited.

The architect l’Enfant, who designed Washington DC, said “make no small plans.” If we are to think boldly, we can only do so if we build our plans around excellent people – faculty and staff, as well as outstanding students who then graduate and become outstanding alumni. Outstanding people not only bring wide-ranging intellect to the task of defining the technological university of the 21st century, but they also bring discipline and drive, creativity and curiosity. And we believe that the technological university of the 21st century is a community of learners, all engaged in the process of discovery at some point on the spectrum.

This year our offer of admission proved to be like a light to a moth for applicants, as students chose to come to our campus in record numbers. Over the past decade, our enrollment has grown by almost 5,000 students, and these bar graphs illustrate the growth of the past five years. Our graduate programs have especially grown, and we have awarded more Ph.D. degrees since 1994 than in all of our history up to 1994.

Balancing accessibility with academic rigor can sometimes be tricky, and nationally indicators like SAT scores are down. The University of California system, for example, reported a 15 point drop in the average SAT score of students who applied for admission this fall. Here at Georgia Tech, our SAT scores increased even as we enrolled our largest class of freshmen in Institute history. We also achieved a record graduation rate for 2006 graduates, a sign our efforts to create a culture of student success are succeeding.

Our students excel after they arrive, winning prestigious scholarships in growing numbers. We have grown accustomed to have Marshall and Goldwater Scholars, although this was the first year we had three Goldwaters at the same time. The Astronaut Foundation Scholarships are relatively new for us, and they are significant. Only sixteen scholars were chosen nationwide – two of them at Georgia Tech – for motivation, imagination, and exceptional performance in science and engineering, with each scholar winning $10,000. And the Anita Borg Memorial Scholarship honors outstanding young women studying computing and technology.
It is a challenge for a technological university that values excellence to field competitive sports teams at the highest levels of competition, but Georgia Tech does it. Last spring our sports teams were especially strong, and they also achieved in the classroom. Over half of our student athletes were on the dean’s list, and Kristi Miller rose to be the nation’s top women’s collegiate tennis athlete while being named first-team Academic All-American for her 4.0 GPA.

One of the biggest factors in attracting outstanding students is an outstanding faculty. And the Georgia Tech faculty continues to be recognized for excellence in a wide variety of ways. Some of the awards shown here represent the most prestigious honor in their respective fields, and the achievements of these faculty reflect well on Georgia Tech.

We also have a growing list of faculty who are being elected to membership in prestigious organizations. We continue to rank second in the nation in the number of young faculty who have won CAREER Awards from the National Science Foundation. And as these lists demonstrate, our interdisciplinary nature is beginning to show itself in faculty from Management winning NSF CAREER Awards and faculty from engineering winning Fulbright Fellowships.

Over the course of the past year we have also had new leaders accept the challenge of defining the technological university of the 21\textsuperscript{st} century. Gary Schuster, who served as dean of the College of Sciences since 1994, took on the assignment of Provost following the departure of Jean-Lou Chameau to CalTech. Steve Salbu came to us from the highly regarded McCombs Business School at the University of Texas, and we believe the College of Management has a bright future in his hands. Long-time Tech professor Ron Bayor has taken the helm of the School of History, Technology, and Society.

On the administrative side, we have welcomed Dan Radakovich as our athletic director, and asked Jim Fetig to bring a branding perspective to Institute Communications and Public Affairs.

Truly outstanding people also have a commitment to service, and I believe that Georgia Tech must lead with its heart as well as with its head. We have knowledge and expertise that can be put to work to serve those in need, and it would be an indictment of us if we did not use it.

The most dramatic example from the past year was Hurricane Katrina. Among the first wave of evacuees to reach Atlanta were 275 students fleeing the flooded campus of Tulane University. After a few hours’ sleep, some pizza, and a shower, many of them were able to continue on home. But for about 75 who had no where else to go, we negotiated temporary housing on behalf of Tulane. Then the next wave of evacuees moved into the Coliseum, which was turned into a Red Cross shelter for about a week.

The evacuees soon returned home, moved on, or found permanent places to live in Atlanta. But Georgia Tech’s involvement was just beginning. Teams of students volunteered on the Gulf Coast over winter and spring breaks. Teams from GTRI went to the Gulf Coast to train clean-up volunteers in safety precautions and hazards. Teams of engineering faculty went to survey and document the damage and prepare for rebuilding.
The Department of Defense asked me to chair a committee to provide oversight of the work to rebuild and improve the hurricane and flood protection infrastructure of the New Orleans region. And Georgia Tech’s Civil Engineering Chair Joe Hughes spearheaded the organization of a three-day symposium to examine the best approaches to rebuilding the full range of public infrastructure in New Orleans.

The symposium was just held a few weeks ago, and the committee I chair continues its work. Rebuilding the Gulf Coast in general and New Orleans in particular will be the largest construction project ever undertaking in U.S. history, and it will stretch ahead of us for many years. It is an opportunity for Georgia Tech to contribute both leadership and service.

Another dramatic way in which Georgia Tech serves those who need our expertise is in the development of sophisticated electronic tools to enhance life for those with disabilities. This slide lists two technologies that have come to fruition and garnered attention during the past year. The goal is to enable those whose sight or hearing has failed them to use technology to go beyond their disabilities and embrace many of the same opportunities that are open to the rest of us.

Our students play an important role in Georgia Tech’s service to others. The student team pictured here developed a plan to revitalize a historic but deteriorated area of downtown Dubai. Their plan won an international competition because it was based on the culture and traditions of the region but also incorporated the latest in sustainable design.

And yes, that is Tech star receiver Calvin Johnson in the picture on the left. He could have spent the summer a lot more comfortably than helping design and build solar latrines, but he was quick to decide that he wanted to help the less fortunate. And in so doing, he helped to inaugurate the newest collaborative endeavor between Georgia Tech and Emory University – the Center for Global Safe Water, which addresses water and sanitation problems in developing nations as a way to improve community health. In January, after the football season is over, Calvin plans to head for Bolivia to demonstrate how to build the latrines he helped design.

The high caliber, focus, and hard work of Georgia Tech’s faculty, staff, and students are lifting the Institute to new levels and attracting attention from others. We hold a growing list of top-tier rankings across a broad range of measures – from the excellence of our academic programs to the quality of our students and faculty. From leadership in technology transfer and commercialization to leadership in athletics. From outstanding facilities to an outstanding workplace environment.

Defining the technological university of the 21st century does not follow an established roadmap. It is not a challenge for the slow or faint of heart, but requires courage, agility, hard work, perceptiveness, and a willingness to take intelligent risks. As we keep our sights focused on that goal, it is nice to hear from someone on the outside that something notable is happening on our campus. And that is what happened this year when Tom Friedman visited our campus and was so impressed by what he saw that included Georgia Tech as a model in a chapter called “The Right Stuff” in his new, expanded edition of *The World is Flat*. 
When all results are in, I believe we can conclude that we are off to a good start toward our goal of defining the technological university of the 21st century. For that I thank all of those who have taken the challenge on, and who made good things happen. I look forward to working with my colleagues in helping Georgia Tech become one of the global universities that will help transform the future.