# The Research University - Transitioning from an Era of Expansionism to an Era of Quality

## Presented to the KPMG Peat Marwick 21st Century Higher Education Conference
### December 4, 1995

## By

## G. Wayne Clough
### President
### Georgia Institute of Technology

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The mid-1970's to 1990's saw the sea change that brought us the end of the cold war and a world where the United States found itself and its products forced to compete against newly powerful economies from the east and the west. Traditional industries, the "leading indicators" of our economy, felt the impact of the new competition first and were forced to undergo drastic change to survive. Those that understood the magnitude of the challenge and underwent transformation are still with us, while many others are only memories.

The altered environment took longer to impact the economic "lagging indicators," with higher education being one of these. Those of us in this segment of our society are still in the process of dealing with a rapidly evolving landscape that has been characterized by the University of Michigan's President, James Duderstadt, as follows:

"There is an increasing sense among American higher education's leaders and constituencies that the 1990's will represent a period of significant change on the part of our universities. If we are to respond successfully to the challenges, opportunities, and responsibilities before us, we will need to develop the capacity to transform ourselves using entirely new paradigms that better serve a rapidly changing society and a profoundly changing world."

We confront this new era following several decades of unprecedented growth in campus enrollments, research and outreach activity, infrastructure development, sports programs, and administrative systems. The future will be much altered from that of the past, and the challenge will be to sustain strategic development while focusing on building quality in those elements of our mission that are keys to our future.

### Characterizing Georgia Institute of Technology as an Institution

To allow an understanding of the plans being undertaken at Georgia Tech to address the future, I need to provide background about the institution, and the group of universities it calls its peers. Georgia Tech one of the 88 institutions of higher education termed Carnegie I research universities. Among our peers, we are on the unusual side in that we have a relatively focused mission, most commonly known for what we do in engineering, science, and architecture. Yet we also have a fine and improving programs in business, economics, international affairs, public policy and humanities. According to rankings like those in U.S. News and World Report, we are a "top fifty" university. As a public school, we are one of the fifteen so recognized, and if you believe these kinds of exercises, our academic reputation would be among the top ten public institutions in the nation.

Among our peers in the deep south, only Duke University with its medical school, and ourselves rank among the top thirty universities in the nation in research expenditures. We are blessed with bright students - our entering freshmen rank at, or near, the top in combined SAT scores for public institutions and ninety percent of them come from the top ten percent of their class. Georgia Tech is the only university with an engineering program in the State of Georgia, and we are in the fortunate position of having a state government that is supportive of higher education.

As a university in Atlanta, the summer of 1996 looms large on our calendar since the city will host the 1996 Centennial Olympic Games. We have special reason for our anticipation. Although in past Olympics universities have provided venues and portions of the housing for the competitors, Georgia Tech is giving up its entire campus for two months to serve as the 1996 Olympic and Paralympic Villages as well as the site of five Olympic venues.

To prepare for our responsibilities, over a two year period to end in June of 1996, we will complete $250 million of construction involving 64 buildings and 2,300,000 sq. ft of renovation and new facilities. Seven new residence halls are being built and all old dorms and most fraternity and sorority houses are being renovated resulting in a doubling of our on-campus housing capacity to 65% of our student population. The campus and our buildings are being outfitted with high speed networking capabilities and a ten channel closed circuit television system.

Funding for this construction effort is being provided by the Atlanta Committee for the Olympic Games, the State of Georgia, private contributions, and state bonds which must be paid back over time from user fees such as the room charges for the new residence halls. Our debt at the end of the Games will be over $110 million.

All things considered, Georgia Tech will enter the next millennium under circumstances other institutions would envy. Yet, although this is true, like our peers in the research university constellation, we are faced with the task of navigating a territory that is not well mapped and potentially hazardous. In this journey, unwise decisions will have consequences beyond the bounds we have known before.

## The Research University System and Its Challenges

The modern research university system in the United States today finds itself in a paradoxical situation. Surveys show it as one of the few institutions held in high regard by most Americans, but at the same time it has come under sharp criticism. Yet the fact is the research university is one of the greatest developments of the twentieth century. This institution is the central reason why the United States each year reaps the largest numbers of Nobel Prizes, and has the most vibrant economy in the world. It is the source of some of the greatest breakthroughs that have enhanced the quality of the lives of all mankind.

As Erich Bloch, former director of the National Science Foundation, recently testified to Congress: "The solution of virtually all the problems with which government is concerned: health, education, environment, energy, urban development, international relationships, space, economic competitiveness, and defense and national security, all depend on creating new knowledge—and hence upon the health of America's research universities."

Yet the critics persist in challenging the concept of the research university. Books like "Profscam" and "How Professors Play the Cat Guarding the Cream" have delivered to the public unflattering views of the faculty and administrators of universities, particularly research institutions. We can hear voices that are finding resonance with some in our land who argue that tenure and faculty governance stand in the way of progress. In his book "To Renew America," Speaker of the House of Representatives Newt Gingrich highlights a case where a faculty opposed the implementation of a distance learning network, and he comments, "The faculty - like any other guild or labor union - wanted to deliver less education for more money." He goes on to say, "College and university faculties have developed a game in which they have lots of petty power with very little accountability.....We need a thorough review of higher education by outsiders to determine how America can best organize learning for adults."

Pressure on higher education and the research university comes at a time when other issues pose challenges to our campuses:

1. An expected downsizing of the federal research funding agenda - it is estimated that federal funding for research will be reduced by 30% by the time the federal budget is balanced in 2002.

2. Steadily increasing numbers of universities and their faculties being asked to seek declining numbers of research dollars.

3. Shifting of research targets from a cold-war driven economy to an "economic war" driven economy.

4. A growing xenophobia about the presence of foreign students on our campuses and the support of these students using either state or federal funding.

5. Growing numbers of lawsuits over socially-driven issues, to the point that considerable time and significant sums of money are being spent in defending the university.

6. Questioning of what is perceived as lack of allocation of university resources and commitment to the undergraduate mission.

7. The rapid rise of new generation educational technology, information access, and communications tools that will emphasize learning over teaching.

8. The growing importance of interdisciplinary issues in the disciplinary world of the university.

9. A steadily growing drumbeat for accountability in financial and productivity matters.

It is apparent from this list of challenges, that even if the external criticism of the research university were not correct, it must reassess its role and future. I would suggest that because of the centrality of the talent and capability of the research university to the United States it behooves us to find rational means to change what is needed and to avoid destruction of these large, but fragile institutions.

To achieve this goal, it will require innovative thinking, adaptation of new management strategies, and a willingness for faculty, administrators, governing boards and government representatives to work together. Remembering the old Laurel and Hardy movies, when the inevitable disaster was created by some combination of Ollie's and Stan's misadventures, Ollie was fond of saying to Stan, "This is a fine mess you have gotten us in." While I can argue that we are not in a mess, we are in a particularly challenging situation, and we should acknowledge that all of us need to take joint responsibility for saving the remarkable institution that is the research university.

## How the Research University System Arrived at Its Present State

Before beginning to define a "fix" for the research university, it behooves us to understand how we got where we are. In the history of American higher education—a history which dates back 350 years—the concept of research university is relatively new.

The earliest American university was the colonial college. The mission of these colleges was to educate and morally uplift the coming generation. Teachers were concerned with students' moral and spiritual beliefs. Harvard, founded in 1635, was of this mold. Faculty were employed with the understanding that they would be educational mentors, and teaching, not research, was the yardstick by which faculty were measured.

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The next phase of education was the service or Land Grant universities. As the nation began to take shape, higher education's focus began to shift from the shaping of young lives to the building of a nation. During the depths of the Civil War, Congress took time from its war duties in 1862 to pass the Morrill Act, sponsored by Justin S. Morrill, a Vermont congressman.

The land grant university represented a shift from an emphasis exclusively on classroom education to one including applied research and service. Faculty were encouraged and rewarded to improve methods and equipment for farming and manufacturing, and bring the results to the users through outreach efforts. Although Georgia Tech has many of the attributes of a land grant university, it was founded by a highly foresighted special act of the Georgia Legislature in 1885 to provide an avenue for specialized education in engineering, sciences and business. The vision for the school, later proven valid many times over, was that it would aid the state in its efforts to leave the shadow of the destruction wrought by the civil war and help it diversify from an agrarian-based economy.

Shortly after the land grant university was introduced in this country, the first research university was established with the founding of Johns Hopkins. Hopkins was modeled on the great research universities then in place in Germany, where students were awarded a new degree, the Ph.D. Faculty at these schools were encouraged to place research at the top of their priorities and were promoted and rewarded due to their performance in the laboratory, rather than the classroom. Daniel Coit Gilman the first president of Hopkins related that under other university models, "...the ablest teachers were absorbed in routine and forced to spend their strength in the discipline of tyros (beginners), so that they had no time for carrying forward their studies or for adding to human knowledge." In today's environment, this comment almost has the ring of that by the cynical wag who retorted that "students are the crabgrass on the lawn of academia."

During the intervening years from the 1870's to World War II, many universities founded as colonial colleges and land-grant universities migrated to the research university paradigm.

World War II created the circumstances that led to a dramatic transformation and expansion of research universities. During the war years, government and universities joined together to fund and create new technology — technology which was instrumental in helping America win the war and pull itself out the Depression. After the war ended, Vannevar Bush of MIT was instrumental in preserving the partnership by establishing National Science Foundation (NSF) and securing research funds for basic research in science and engineering. During this period, faculty became more specialized as discipline-based departments became more popular, and universities began to depend on the funds generated from faculty research. Also important, prestige and promotion for faculty required clear evidence for research and scholarship, grantsmanship, and graduate student production.

The sustained growth of the nation's system of research universities in the 1960's, 70's and 80's was fueled by funding from NSF and the mission agencies, particularly the military and defense establishments. At Georgia Tech funding provided by defense or military agencies still makes up about 55% of our total grants and contracts.

The growth of the research mission in universities was paralleled by a trend for these same institutions to expand their roles in society. They found themselves providing entertainment through performing arts centers and feeding the American appetite for athletic competition through expanded, and higher quality, intercollegiate sports programs. Rapid growth also occurred in student enrollments at many schools along with noticeable increases in numbers of non-U.S. students at the graduate level. The non-U.S. students, who often came with outstanding analytical skills, assisted the university in fulfilling its research ambitions, but also posed problems in managing the enterprise because of their special needs.

Georgia Tech fits much of this profile, with its enrollment having doubled from 1960 from over 6000 to 13,000 today, and increased its research funding up from $8 million in 1960 to $200 million today. Of its student body, 1200 students are internationals. We have also have built a creative arts center and a well appointed recreational sports facility, while operating a sixteen sport Division I-A athletic program. For a public school, Georgia Tech early-on recognized the value of private support and today has a sound endowment for a public university. Although we are small compared to the large comprehensive universities, we have an annual budget of almost $450 million, a work force of upwards of 4000 people.

It is easy to conclude from this history that the typical research university, is a victim of its own success and its willingness to attempt to satisfy so many of society's demands. Its growth in so many areas is one primary reason why there is never seems to be enough money to do what is at hand.

The modern research university is a complex domain within whose boundaries we contend with the problems of 17 and 18 year olds, anxious parents, the needs of the greatest scientists and engineers in the world, a massive facilities base, NCAA regulations, industrial and government research sponsors, sports fans angry over last weeks game, the concerns of legislators, citizens upset by student publications, societal issues, and so on. Research universities, particularly those built on a recent growth pattern, also typically find themselves with immature and inadequate financial and management systems operated by an employee force that is often under-trained. Thus, as is all too common today, research universities find themselves the subject of bad audits, reports of misplaced inventory and poorly managed financial and human resources.

Even if we were not facing the challenges of a new era, it is also apparent that the growth bubble of the past 40 years is losing its steam since the factors driving it cannot be sustained. I suggest we are entering a time where the emphasis has to be on improving the quality of what we do rather than growing it. The past of the research university is important, but it is not the prologue to a future with dramatically different constraints and opportunities.

## What is Needed for the Future

The issues facing research universities are remarkably similar. Yet the means to address them will vary by institution depending on factors such as whether it is state-supported or private, the nature of its financial structure, the sources of students, and its mission. Georgia Tech is in a more favorable position than many others to emerge successful in its journey, but it cannot do so without responding vigorously to the changed circumstances facing higher education.

What are we doing about it?

### 1. Listen and learn.

We are committed to listening to both our critics and stakeholders, and seeking to understand the messages and sort out those that are the most meaningful. We know our present model of higher education evolved under a special set of circumstances and does not hold the key to the only successful kind of learning. A story related by Frank Rhodes, President of Cornell, provides an apt lesson for us.

In Virginia in the 1770's the colony felt the local native Americans would be bettered if some of the young men were sent to Williamsburg College. They offered to take in six braves. To this the tribe replied:

> "We thank you heartily. But you, who are wise, must know that different nations have different conceptions of things, and you will therefore not take it amiss, if our ideas of education happen not to be the same as yours. We have had some experience with it. Several of our young people were formerly brought up at your colleges; they were instructed in all your sciences; but, when they came back to us they were bad runners, ignorant of every means of living in the woods, unable to bear either cold or hunger, knew neither how to build a cabin, take a deer, or kill an enemy, spoke our language imperfectly, were therefore neither fit for hunters, warriors, nor counselors, they were totally good for nothing.
>
> We are, however, not the less obliged by your kind offer, though we decline accepting it; and to show our grateful sense of it, if the gentlemen of Virginia will send us a dozen of their sons, we will take care of their education; instruct them in all we know and make men of them."

We could learn from this instructive experience. We do know we have to continue to listen and work with our stakeholders and critics.

### 2. Conduct coordinated and comprehensive planning exercises and tie the outcomes to processes and expectations.

a) Central to all planning at Georgia Tech has been our institute-wide strategic planning exercise that relied on input from inside and outside the Institute. The intent of this effort was to re-establish our core values, to understand our strengths and weaknesses, to identify key dimensions of the future, to define our goals and optimize resources and lay the blueprint for how we will get were we expect to go. A key element includes the decision to slow on-campus enrollment growth with an ultimate limit of 15,000. This will allow us to focus on improving quality of all that we do and insure we have a better chance to remain flexible in a time of change.

b) We recently completed a comprehensive examination of our financial and management systems using the help of a team from KPMG Peat Marwick. We felt it was important to use an entity that could provide an external view of our processes and provide advice from that perspective.

Following the overview study, we are now continuing a series of more focused investigations of areas of particular importance or high risk, and undertaking an series of immediate actions where it is clear hesitation is not acceptable.

c) We have underway a thorough facilities study to establish a baseline for our infrastructure and a foundation for a new campus master plan. Our massive present construction program leaves us little room on our campus for future expansion or allowance for places for quiet contemplation. What remains must be used to the best effect to create a true collegiate campus.

**3. Undertake actions that demonstrate short-term successes to the internal an external audiences:**

a) The staff of the Office of the President was reduced by 40%.

b) We completed a first phase reorganization that eliminated three vice presidencies and their support staff.

c) The upper level decision-making processes are being redefined to be driven by academic issues with input from a wide range of stakeholders, while implementation processes are being modified to be controlled and carried out by small teams of highly knowledgeable administrators and staff.

d) A number of new training and mentoring programs have been developed to show clear investment in staff and administrators.

**4.) Address the weaknesses identified in our financial and management systems.**

Our goal is to create a modernized financial and management structure that reflects the substantial levels of our budgets and the complexity of our funding sources. This effort is also designed to refocus our staff culture towards a customer orientation and increase access to information for our students, staff and faculty. This will occur in a series of phases, some of which will require several years to achieve.

**5.) Create the prototype of a high quality living/learning environment capitalizing on the high-tech residential and athletic infrastructure that will be our Olympic legacy.**

Learning and communications on campus will be aided by full access for all our students, staff and faculty to a high speed, interactive data and visual network, the presence of a comprehensive computing and communications system, and the availability of a ten channel closed circuit television system. To insure universal access by our undergraduates to our systems, we are actively considering requiring computer ownership for them. These computing and communications tools will help better integrate the living environment with the academic mission of the Institute.

**6.) Tie future construction to strategic goals for campus development and research initiatives.**

We will focus future construction on campus to selected areas that support our strategic goals and create a funds source for maintenance that will allow appropriate upkeep for new and existing facilities. Ancillary, or non-student/faculty intensive operations will be located in areas adjacent to campus.

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**7.) Continue a successful research enterprise in the face of the expected reductions in federal funding.**

This sounds like a refusal to adapt to a new set of constraints. However, our institutional strengths match the post-cold war needs well, and we are setting in place the means to be more responsive to changing research agendas and to assist us in inter-university and industry collaborative efforts. Additionally, we are supported in our efforts by a growing state-presence in Georgia through the Georgia Research Alliance. We do expect that research growth in the future will be more focused towards areas that are strategically defined than in the past.

**8.) Get back to the basics.**

Develop a full and creative learning environment for our students and insure our undergraduates receive a "fair share" of the resources we have. To achieve at the high levels we will expect, hire the best people with the talents to match our needs. Seek to continuously improve systems and processes while building a culture to allow us to be accountable to all of our stakeholders. And, build an environment where communications and ethical behavior are valued and practiced by all.

In conclusion, just as business was earlier swept by the sea change of increased competition, the need for increased quality, and the demand for higher accountability is at the doorstep of higher education. It is my belief that those of us who adopt standards of quality, listen to our audiences, and plan carefully for the future based on core institutional values will succeed. History has demonstrated the capabilities of the research university, it is now up to us to write the next chapter in that history. We plan for that history to include Georgia Tech as one of its success stories.