

EXECUTIVE ROUNDTABLE

Good evening. Before I begin, I'd like to do a quick poll. If your answer is yes, please raise your hand:

Was Tech's reputation one of the reasons why you chose to attend Georgia Tech?

That's what I thought. Each year, thousands of students like you choose Georgia Tech because they want to attend a school with a stellar reputation, one whose graduates are sought after by employers, one whose professors are internationally recognized, and one where they can participate in the learning experience through labs and research.

Currently, there are 88 universities designated by the Carnegie Foundation as Research Universities I. In Georgia, Georgia Tech, the University of Georgia, and Emory University are considered research universities. It might surprise you to know that in the history of American higher education -- a history which dates back 350 years -- the concept of research universities is relatively new.

In America, there have been three distinct, overlapping phases -- each one giving birth to a new type of university.

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. Faculty were employed with the understanding that they would be educational mentors, both in the classroom and beyond, and teaching, not research, was the yardstick by which faculty were measured. In 1869 during his inaugural address Harvard president Charles Eliot, neatly summed up this philosophy when he said: "the prime business of American professors...must be regular and assiduous class teaching."

Next came the service or Land Grant universities, initially authorized in 1868 by the federal government. 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 this time period, the Land Grant College Act gave federal land to each state, with proceeds from sale of the land to support both education in the liberal arts and training in practical skills like agriculture and manufacturing. In a somewhat ironic twist, although Georgia Tech was established as a result of our founders' wish to provide this practical technological training to our students, all of the Georgia Land Grant monies went to the University of Georgia.

Faculty of land grant universities were encouraged to provide practical information (mechanical and agricultural arts) to the student and the citizens of the state. These universities also were to seek to

provide education to students from wide social and economic backgrounds, not just students from privileged families. In this environment there was a shift for the faculty from a singular focus on classroom education, to one which included applied research and development. The "reward" system for faculty was modified to include recognition for improvement of methods and equipment for farming and manufacturing. Some faculty were even not expected to teach in this system, but rather focus only on the research side of the spectrum. Today's amazingly productive agricultural industry in this country can largely be attributed to the efforts of the land grant universities.

The next stage — and one that gave birth to the modern Georgia Tech, is the concept of the research university. In the beginning, the American research university was modeled upon the research orientation of the premier German universities. Due to the German influence, education became more specialized, and the Ph.D. degree was introduced.

The first American modern research university was Johns Hopkins. Founded in 1876 by Daniel Coit Gilman, Johns Hopkins was based on the conviction that knowledge was most attainable through research and experimentation. Faculty at these schools were encouraged to place research at the top of their priorities, and faculty were promoted and rewarded due to their performance in the laboratory, rather than the classroom. The growth of

research universities in the late 1800's and early 1900's were limited since funding to have faculty who did not have a principal teaching role was largely limited to private universities with large endowments.

The research university underwent a dramatic transformation through the events prior to, during and following World War II. During those years, government and universities joined together in a powerful partnership 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, three factors changed the face of what were to become our premier research universities. First, the scientists and engineers who had found special value in their research experiences in WWII, came back to universities and determined to continue that research. One of these was Fred Terman of Stanford University who masterminded the development of the partnership of industry and university that has become today, Silicon Valley. Fred Terman was also a mentor to Joe Pettit. Joe Pettit replaced Fred Terman as Dean of the College of Engineering at Stanford, and subsequently came to be President of Ga Tech. With the coming of Dr. Pettit, Georgia Tech moved strongly towards a classic research university model. Second, a new generation of students arrived on campus - the veterans - looking for real challenges and new experiences. Third, Dr. Vannevar Bush of MIT was

instrumental in working to develop a federal funding mechanism for university research, what we know today as the National Science Foundation. preserving the partnership and securing funds for higher education. The partnership of research oriented faculty, mature students, and federal funding stimulated dramatic growth of university research. It was during this period, that 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 became based on contributions in research and publication, in addition to what they did as teachers. In fact, in the research university, one could not be promoted by being a "good teacher" only.

Now in terms of time, we come to the instant when I undertook and completed my college education. I am a truly a child of the modern research university. I worked on my Ph.D. at one of the best, UC Berkeley and my career has always been entwined in research universities. Over my time, I have advised to completion 25 MS students and 34 PhD's. I have always taught, but research has also always been part of my life.

Georgia Tech is also a "product" of the research university era. As is typical of a serious research university, our research budget today exceeds our state support. In 1994, our budget was \$370 million,

of which, only \$120 million came from the state. Over \$170 million of our \$370 million is derived from the research dollars earned by our faculty. Much of our hard-earned national and international reputation comes from our research activities and publications.

That brings me, and us, to the present research university, which today is a victim of its own success. Sadly enough, almost all universities aspire to be Carnegie Research I universities since that is the road to national and international prestige. However, today the engine that drove us to the present position is not running on all cylinders. The numbers of competitors for research funding is substantial, while federal funding levels are being reduced in most cases. Defense spending has been substantially reduced and is likely to be further downsized. Universities dependent on this source of funding have to be especially nimble to avoid serious problems. In addition to problems with funding, there are ever increasing levels of oversight and accountability for monies spent in research.

To some degree, industry has stepped in to fill the gap left by federal funding. This is being driven by a desire to access university talent, but also to address needs created as industries downsize or eliminate their own research operations which do not appeal to the present "bottom-line" thinking. With some effort, and the modern research university now

collaborates reasonably well with both government and industry.

Additional challenges now face the research university since there is a growing demand for "balance" to be provided in the teaching/research mission. As tuition costs all over the nation rise, parents and students want to ensure that they are getting their money's worth — that the education they receive will serve them well in their future. So pressure is brought to bear on universities to emphasize teaching undergraduate students and de-emphasize research. Finally, critics also have charged that too much of what passes for research is not useful and simply fills up libraries with worthless proceedings.

The debate is engaged and often framed as "What is more important? Teaching or research? Should faculty spend most of their time with students or in research?" I would argue this is not the correct context, but does the best job of capturing a "sound-bite" posture for the debate.

Both sides have strong arguments. Students deserve to have a degree of personal attention and interaction with the professors that have made the school famous and given the school its reputation. Students can rightfully say they don't pay thousands of dollars in tuition each year to be taught by graduate students.

However, faculty know that if they spend the majority of their time in the classroom and in advising activities, their research-based reputations, that of their disciplines, and that of the school will suffer. Faculty can also rightfully argue that since graduate students are involved in research all along the way, that what some call research is actually teaching in another form. Supporters also note that research brings in better equipment, a better infrastructure, and more prominent scholars. Proponents of the research university say that if students want to attend a university with a national and international status, compromises must be made.

Of course this type of philosophy doesn't go over too well with the undergraduate student and their parents when they perceive they are getting a lesser education than that at a small, less prestigious school. As both a university president, a teacher of some repute, and father of two, I see both sides. In a perfect world, our faculty would have unlimited time — and be able to spend quality time with students both in and out of the classroom and still have time for the research that is so vital to a university's continued success.

My personal belief is that in order to be a successful research university, we must cooperate and compromise. We must put a human face on research and strike a better balance in the larger

university effort that is devoted to undergraduates vis a vis graduates. We have to bring the values of a research style learning process to the undergraduate. And we have to reward our faculty for both innovative teaching and research. In the '80s, research was overemphasized by too many — too often faculty were rewarded strictly on the basis of research, and students did lose out. In the '90s, we have begun to shift the emphasis from strictly research to research and education. At Georgia Tech, programs for new teachers have been set up to educate them about quality teaching and recognize excellence in the classroom. Other programs we are considering to improve the education experience involve technology. In the future, our professors will be encouraged to communicate with students through e-mail and interactive video, as well as in the classroom. I also believe more of our "teaching" will be done through self-learning using computer tutorials.

The questions I have for you today are: How does the modern research university, such as Georgia Tech, strike a balance between research and teaching? How do we enhance our prestige through research — thereby encouraging future generations to attend our universities and — while still giving the best learning/teaching experience to our students?

Thank you very much.