The Public Research University of the Future

A Report to the Commission of 125
and the University of Texas Community

May 9, 2011

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President

I have never been prouder to be a Longhorn, with thousands of students, faculty, alumni, and friends around the world who continue their strong support for the University they love and cherish.

I can't thank each of you individually, but I do need to recognize two of you: Kenny Jastrow, who chaired our Commission of 125, and Natalie Butler, our Student Government president. Thank you.

As Kenny mentioned, I want to update you on issues confronting higher education and our own great University. I'll concentrate on three areas: (1) our budget situation, (2) our vision for the future of UT Austin and public research universities, and (3) how we can reconcile that vision with current questions about higher education in Texas. I want to talk about our disciplined culture of excellence and innovation. And in the process, I'll give you an update on some of the initiatives set in motion by the Commission of 125.

As the end of the semester approaches and the majority of our students prepare to leave campus, we still do not know what the upcoming state budget will be. Here is where things stand. Under the House version, state general revenue for UT Austin will decrease by 20.5%, or $57.1 million per year. The Senate version would reduce our general revenue by 16.1%, or $44.9 million per year.

We already decreased our budget by 5% of our general revenue--$14.5 million--during the 2009-10 fiscal year, and we have carried those savings forward. This fiscal year I asked all the deans and vice presidents to plan for an additional 10% reduction in state appropriations—$29 million per year. I congratulate the deans and vice presidents for their hard work and vision in preparing these cuts.

If the Senate version of the appropriations bill is adopted, our budget preparations are nearly on target. That is, we have prepared for 15% in cuts, and we will have to deal with an additional 1% to achieve the full reduction. If the House version is adopted, we still have another 5.5% reduction to absorb. We will have to make up the difference with reserve balances, additional budget cuts, and layoffs. There is no question that this would further harm our educational mission.

I wish I had better news, but that's what we know as of today, 21 days before the legislative session ends. Of course, a lot can happen in 21 days. And I know that our legislators and the legislative leadership are working very hard under very difficult circumstances.

But next year's budget is only part of our challenge, and it is emblematic of a long-term trend. The state, once a primary source of funding, now supplies a small fraction of public university budgets—about 14 percent at UT Austin this year. Three decades ago, in 1981, state support amounted to 52% of our budget. If the House version of the budget passes, we will be down to 13% state support. This is a profound change. But it is only one of many seismic shifts in society that affect higher education.

Families are still grappling with a deep recession and many uncertainties. Current demographic and social trends are greatly expanding the number of people seeking higher education. The role of the university in society has expanded from one of primarily training a workforce, to becoming partners in innovation for the private sector, entrepreneurial communities, and other educational institutions. And, of course, who can fail to note the rapid changes in technology? Entering students today can't recall a time before the Internet. The Web, smart phones, and other technologies are second nature to them.

So as the world changes, so must we. We have to reinvent the way we do business. Our current approach simply is not sustainable. We can't just long for the old days; we need to be on the leading edge of change. We need to be more productive so that we can do more with less. That was my message in the State of the University Address last September, and it is my message here today.

In a moment, I will share many of the changes we are already making, but it is important to note that we have been reinventing the ways we do things since the Commission of 125 issued its report in 2004. It is simply wrong to claim that UT is not interested in or engaged in change. We must continue to change or we will not survive as a great institution.

The good news is that we are well poised for change. UT has always been an engine for change and innovation. Change and innovation are in our DNA.

Consider the Commission of 125, a group of leading citizens from outside the University who worked with us to ask the very question of how we needed to change to achieve our goal of becoming our nation's best public university. After two years of systematic and thoughtful study, Commission members told us we did need to change, and we have. They gave us marching orders in 2004 about both *what* we should be doing and *how* we should be doing it. The Commission set high expectations for a disciplined culture of excellence. It said we should focus on the undergraduate experience, and that we should be selective and strategic in how we invest in programs. We should set a higher standard of leadership in the colleges and departments and then empower those leaders to make their units truly great. These were insightful goals.

And the Commission of 125 was not the first. On our 75th anniversary, the Committee of 75 did the same thing. And again on our 100th anniversary, the Centennial Commission advised us how we needed to change in response to a changing world. I was on the 40 Acres then, and the changes we made had a transformative impact. The Commission of 125 was just part of our tradition of innovation. And the changes it recommended have had a transformative impact.

We all come from different religious traditions. My own is Presbyterian. We say the church is not just reformed; it is *always reforming*. That idea is at the core of UT. Not just when the commissions are on campus, but always. Indeed, that was my core message last September.

But there was a second part of my message in September. As we change, we must be guided by a vision of the true value of a world-class teaching and research university. That part of the message is more important today than ever.

So what is the value of a great research university? And what is our vision for the public research university of the future?

The public research university of the future must solve global problems, expand knowledge, and improve lives throughout society. Our faculty are working on energy sustainability through research initiatives in carbon capture, large-scale alternative energy storage, and solar energy. Our advanced computing capability, which includes one of the world's most powerful supercomputers, is being applied to the study of hurricanes, oil spills, and earthquakes. We have leading programs to train students in languages that are critical to national security, such as Arabic and Hindi-Urdu, to prepare the next generation of government, military, and business leaders working in the Middle East and South Asia. Discoveries from our faculty laboratories are improving the detection and treatment of diseases such as melanoma, lung cancer, and diabetes. And our faculty have helped draft constitutions in Africa, Asia, and Latin America. Their research and global service enhances international relations and promotes democracy throughout the world.

The public research university of the future must offer the highest-quality undergraduate education and graduate programs, to prepare the next generation of leaders who will change the world. We must do this in a way that is affordable for our students and their families. And we must include all of our citizens.

The Commission of 125 and our best faculty members worked together to determine the skills we wanted the next generation of leaders to gain from a UT education. They told us every student should:

- Receive a broad education that includes exposure to culture, literature, foreign languages, the humanities, and the arts.
- Explore mathematics, science, and technology.
- Learn to think and read critically, write cogently, speak persuasively, and work both independently and as a part of a team.
- Engage in open discussion, inquiry, discovery, research, problem-solving, and learning to learn.
- Examine questions of ethics and the attributes of effective leadership.
- Acquire a sense of history and the global community with a respect for other cultures.

These skills formed the foundation of a bold experiment in our curriculum. The ink was barely dry on the Commission report before reform began in earnest. As dean of the law school, I was asked to chair the Task Force on Curricular Reform.

The task force recommendations augmented the state's core curriculum by requiring students to take designated classes that had a substantial focus on writing, quantitative reasoning, global cultures, multicultural perspectives, ethics, and independent inquiry. It also added a rigorous common intellectual experience known as the **First-Year Signature Course,** to be taught by senior faculty, often in a seminar. In fact, I've taught a freshman seminar every year that I've been president.

Another example of our efforts to enrich undergraduate learning is the **Freshman Research Initiative.** This program provides some 500 freshmen in the natural sciences with a real research experience in laboratories with faculty mentors. These students go on to earn higher grades and more scholarships, and they have higher retention and graduation rates.

When students participate in intensive learning experiences—when they contribute to the development of new vaccines, collect water samples from the coastal wetlands, help villagers obtain clean water in Ghana, or teach art to young

children in Austin—the opportunities for deep learning are great.

Even as we provide students with additional small-group and individual experiences, we are also working to improve the effectiveness of our large enrollment courses. Our **Course Transformation Program**, led by the Provost's Office and supported by the Center for Teaching and Learning, is collaborating with faculty to redesign large enrollment introductory courses, beginning with chemistry, biology, and statistics. Innovations in these three courses alone will touch more than 9,000 students per year. Over the next three years, the initiative will extend to more than ten introductory courses, including several of our most challenging lower division courses.

The public research university of the future must exploit new technologies and the opportunities they create for more learning. As a part of the Course Transformation Program, we are partnering with researchers at Carnegie Mellon and Harvard to deploy new online technologies to support learning inside and outside the classroom, and to provide precise and real-time feedback about what the students actually learn. These technologies offer students additional opportunities to master the materials more quickly and effectively, and to collaborate with peers and faculty. They draw on increased knowledge about how people learn, enliven the delivery of course content, and can be powerful tools to help faculty and students make more effective use of class time.

We can expand the impact of these initiatives by sharing them with other educational institutions. In that spirit, I have convened a group of university and community college presidents from across Texas to collaborate with us on these kinds of projects, and to work with state policymakers to develop and support educational innovations. One of the major objectives of this project is to help students reach similar levels of proficiency across learning environments at various institutions with a wide range of missions. Through these kinds of collaborations, our curriculum redesign and Course Transformation efforts can create new opportunities for tens of thousands of students throughout the state and the nation.

We are also leading initiatives to increase the number of Texas students who are prepared for a research university's type of education. The School of Undergraduate Studies and the Provost's Office are working with Texas A&M and high schools across the state to pilot a unique program that will certify high school students' academic competencies and even allow them to graduate from high school early if they can meet the requirements defined by our faculty in five core areas. This initiative has potential to be a new national model, and to generate substantial savings for students and the state. In addition, we are working with Texas A&M, community colleges, and school districts to develop and deploy new college readiness assignments and instructional modules to help students understand and prepare for university work. In my view, leading these kinds of research and development initiatives to expand opportunities and improve educational productivity is an important responsibility of the 21st century public research university.

These are only some of the initiatives under way to move students from high school to college graduation more efficiently and more successfully. We test students in the summer before their freshman year to better match them to majors. In the College of Natural Sciences, students are tested to diagnose their knowledge of mathematics and can complete online modules to improve their preparation for calculus courses before they ever arrive on our campus. The College of Liberal Arts is using online assessment and learning modules to determine students' proficiencies in foreign languages and help them advance more quickly. We established the School of Undergraduate Studies where students who have not decided on a major can take the classes and get the advising they need, so that when they do find their major,

they don't need to delay graduation by going back to square one.

We have developed other academic support systems, and we have adopted flat-rate tuition, which has led students to take more credit hours and progress to graduation more quickly. All of this, too, lowers cost.

We are rightly proud of the progress we have made in improving our freshman retention rate to 92 percent and the fact that, along with Texas A&M, we have the highest graduation rates among public universities in the state--over 80 percent in six years. But we must do better if our goal is to be a national leader. For us to be the leading public research university of the 21st century, we must also lead in student success.

So in addition to the ongoing initiatives I have outlined, we need to do more.

On average, our students have 142 semester hours of credit when they graduate with bachelor's in degrees in a single major. Students with multiple majors often have more than 160 hours. Sometimes, they take these extra hours for good reason. But too often, it is the result of poor decisions—in choosing a major, in course selection, in matching their talents to their degree plan, or in our own failure to provide enough available course sequences. Greater efficiency in this area will pay enormous dividends in improved graduation rates, lower institutional costs, and reduced costs for Texas families. And, to be candid, we will have to insist that our students justify their course selections with a firm plan for timely graduation.

Families expect that when their sons and daughters go off to college it will be a four-year experience (and a four-year expense), except in very specific programs. We need to honor those expectations.

You may have seen a recent interview in *The Texas Tribune* with Charles Miller. He noted that our biggest focus should be on graduation rates. He is exactly right. Although our graduation rate is the highest in Texas, we should be among the highest in the nation. Our four-year graduation rate should be around 70%. This will save Texas and Texas families millions of dollars a year. It will allow us to provide high-quality educational programs to thousands of additional students. Despite the budget situation, I challenge all of us to deepen our commitment to this work.

Where appropriate, we should also create new pathways for students who want to graduate in three years. Those students will have to be highly motivated, willing to take some summer classes, and most likely would benefit from advanced-placement credit before they enroll. They may have to forego some extracurricular experiences. And we have to ensure coherent sequences and course availability so they can succeed. The College of Natural Sciences has already developed a "Degree in Three" program for six degrees in its portfolio. These programs can save students and their families thousands of dollars. We have already expanded our summer course offerings and reduced tuition for summer enrollment by 15% to make options like this more attractive.

We need to be very mindful of the cost of education. As state support for the University's budget has declined, tuition has increased. But UT Austin remains a good value. *Kiplinger's* magazine lists UT as one of the "Best Values in Public Colleges." Increased financial aid has moderated the impact of tuition increases for students from low- and middle-income families. Our tuition is 8th lowest of our 12-member national comparison group. Combined state support and tuition per student is the very lowest in that peer group. With the help of scholarships and grants, more than 23 percent of this year's freshmen paid $2,500 or less for tuition and books. Those students are indeed on track for a very affordable degree.

The public research university of the future also must reduce costs by increasing the efficiency of its business practices. UT is already lean. Our administrative costs as a percentage of our total budget are about half the state average for public universities. We have eliminated more than 250 positions since 2009 and reduced our annual budget by $14.5 million, and we are in the process of reducing it by about $30 million more. Current efficiency initiatives are projected to save $565 million over a 10-year period. These include moving Information Technology Services under the Chief Financial Officer, eliminating levels of management and reducing the staff by some 70 positions. Annual costs have declined by about $5 million as a result. We're also saving millions of dollars annually through improvements in data warehousing, purchasing efficiencies, and energy and water conservation.

We're conserving our resources by re-thinking how we build and maintain our campus. In addition to designing for green certification for new buildings, we borrowed ideas from industrial design to reduce costs on the new Liberal Arts Building. It is now anticipated to be completed $10 million *under* budget, even after adding 16,000 square feet to the original plans.

We are also efficient in a different way. UT Austin provides the State of Texas with an enormous return on its investment. For an investment of $318 million in state general revenue last year, Texas received the benefit a university enterprise with an overall budget of $2.2 billion. The State's money is like a grain of sand in our oyster, around which a pearl grows, supported by philanthropy, research funding, and auxiliary operations. This is a tremendous leverage for our State. And remember, that doesn't even take into account the long-term value of our research or the total economic activity generated by UT. The latter is calculated to be $5.8 billion per year.

We also focus the resources we have on the programs that can achieve true excellence and that offer strategic opportunities to advance knowledge. The Commission told us that we cannot be preeminent in all fields; we need to be selective. "Creating a disciplined culture of excellence," it said, "precludes the University from trying to be all things to all people." For a number of years now, we have been investing in programs of great strategic value. We are focused on being ever more disciplined in this effort.

Another measure of our efficiency is to compare combined inputs from general revenue, tuition, and the Available University Fund with our outputs, even just focusing on the production of degrees. Under this measure of efficiency, UT ranks No. 1 among 120 leading public research universities in the nation. Let me say that again…under this measure UT is the most efficient public research university in the United States.

But even at No. 1, we can't be complacent. There is much work to be done in further improving our business practices. We need to continue to look at how we organize our administrative and academic units so that we avoid duplication and avoid activities that are not truly critical to our teaching and research mission. I pledge to do that, and I challenge everyone on our campus to do it. Just because an activity was necessary in the past does not mean it is critical to our mission today.

In order to support educational innovation, the public research university of the future must develop new revenue streams to become even more financially self-sufficient. In 2010 we launched H_2Orange bottled water, a partnership that generates scholarship funds from water packaged in a recyclable bottle shaped like the UT Tower. And earlier this year we announced the Longhorn Network, a 20-year partnership with ESPN and IMG College that will guarantee $300 million in revenue to support UT Austin. Half goes to academics. We have already committed

funding from this agreement to create new faculty chairs in philosophy and physics. Over the next 20 years, this agreement will support many more academic initiatives.

And a major entrepreneurial opportunity is to bring more of our research to market through commercialization. Only eight months into this fiscal year we have already received $26.7 million in intellectual property licensing and royalties. That's far ahead of last year's total of $14.3 million, which placed us in the top 20 American universities. That is a great deal of progress since 2005, when we generated only $6.7 million.

We and the other UT System universities filed more than 1,000 patents in the last five years, ranking us No. 3 in the nation.

We have reorganized the way we go about commercialization of our intellectual property. The University now takes an active role in creating start-up companies, evaluating the technology, building the vision for the company, and finding investors. Our goal is to become an active participant in the creation of new companies coming out of the work of our university. We are improving, but to be candid, this is an area where we need to do better. And we will take ideas from every source.

So we have to change, and we are always changing. But there is a second, critical, part of my message. We need to reinvent ourselves with a keen understanding of what it truly means to be a world-class teaching and research university. This University was built over more than a century. We can't be timid about the need for change, but we need to be mindful that we don't undermine the enormous value UT provides for our students and our state.

The Commission of 125 was right when it listed the skills our students will need to be the next generation of leaders. A great university that combines teaching and research is well poised to cultivate these skills. Let me give you just three examples of what happens when you have a critical mass of bright people involved in teaching and research.

Katie Maass is a chemical engineering senior. Two years ago she joined the laboratory of Professor Nicholas Peppas as an assistant. Katie worked on projects to improve drug effectiveness and to develop nanoparticles that can release medicine in the small intestine rather than the stomach. That interest recently helped her win a five-year, $250,000 research grant from the Hertz Foundation. We are proud that after graduation this month, Katie will be pursuing her doctorate at MIT. Maybe someday Dr. Maass will return to UT to pursue her desire to fight cancer and expand knowledge.

The kind of research experience that Katie received as an undergraduate at UT is not factored into the metrics some would use to evaluate Tier 1 research universities. The kind of faculty mentoring and interaction that Katie received cannot be captured in a faculty profit-and-loss statement. Exposing young people to that kind of world-class research is what Texas needs in order to lead.

Professor Todd Ditmire teaches introductory physics to undergraduates. I've heard him speak, and he's a fantastic teacher. His other job is serving as director of the Center for High-Intensity Laser Science at UT. He succeeded in raising $14 million to fund the Texas Petawatt Laser, with most of the funding coming from the National Nuclear Security Administration. The Texas Petawatt has a power output—for a nanosecond or less—more than 2,000 times that of all the power plants in the United States. It is a trillion times brighter than light on the surface of the sun.

The laser gives our faculty members and students the capability to experiment with high-energy reactions, simulate the workings of stars and other

celestial bodies, and investigate nuclear fusion, the process that powers the sun. How many universities in Texas can offer students this type of learning experience? UT can. And can there be any question that Professor Ditmire's students benefit from his cutting-edge research and the opportunity to work in his lab?

History Professor David Oshinsky won the Pulitzer Prize in 2006 for his book *Polio: An American Story*. His work as a historian revealed an important chapter of the human narrative to thousands of readers. It inspired Bill Gates to redouble his efforts to eradicate polio, and in 2011 the Bill and Melinda Gates Foundation pledged an additional $100 million to fight the disease worldwide. Professor Oshinsky exemplifies how historians and other scholars can enrich our understanding of the past and have a major influence on the present.

Katie, Todd, David, we're proud of you. Would you stand so we can thank you?

I could tell countless stories like these. Our faculty and students *are* changing the world.

The combination of teaching and research ensures that students are continually exposed to the most innovative minds at a university. These faculty members show students not only advances in their particular field, but teach them how research is done.

Our faculty members generate a tremendous return on investment in many tangible forms. In 2009-10, the faculty attracted $642 million in external research grants. That is twice the amount of state support we received this fiscal year. But this is not just money. It translates into stories like the three I just told.

So this is my two-fold message: we must continue to embrace change, and we must do it with an enlightened vision of what a great teaching and research university does for our society, and has done for more than a century. It educates. It generates knowledge. It creates prosperity. It nourishes our democratic way of life. And it provides access to the American Dream.

We are not merely open to change, we're agents of change. But in the interest of reform, we must continue to strengthen the things that make American public research universities such powerful engines of innovation. The state of Texas needs not only large numbers of college graduates; it needs large numbers of graduates who have learned to thrive in the kind of educational environment that operates at the frontier of what is known and what is not yet known.

The ability to produce these kinds of advanced degrees attracts business. It gives Texas the capacity to support innovation and advanced technology. It feeds the rest of the educational ecosystem throughout the state, producing the professors that teach at regional and community colleges, and fortifying K-12 education with teachers who are well equipped to prepare their students to face the challenges of the future.

We need to be careful about how we change. It's virtually impossible to innovate from the top down. The successful model for innovation in business is that people at the administrative level create an environment in which people doing the real work of the company can innovate. It's a universal principle, and it's just as true at a university. At an effective university the administration creates an environment in which faculty and students can innovate. So in all these efforts I pledge that we will not dictate from the Tower so much as work in close partnership with our faculty and our students to build a national model for the 21st century public research university.

The result of an unfettered, curiosity-driven research model is that it expands knowledge for society. If we try too hard to direct research from the top, we'll diminish our overall returns. History

has shown time and again that it is very difficult to predict what advances in research – sometimes imperceptibly small, sometimes so obscure that only five people in the world really understand them – will lead to the next big advance for humanity. Pick any revolutionary area – computer science, genetics, molecular biology—and to a one you can trace back through a maze of obscure advances, in which knowledge was built brick by brick into something that we now see as monumental. Our understanding of our culture and the arts, indeed of our democratic way of life and its history, is no different. It builds on insights from the past, revitalized in every generation.

Some insist that one of the most important performance metrics is the employment of our graduates and the amount of their compensation. They measure success only by the short-term return on a student's educational investment. Not everything can be measured in dollars and cents, or in the short term; our principal mission, rather, is to train the leaders of the future who will then change the world. Just last week we saw a vivid example of that. The attack on Osama bin Laden's compound in Pakistan was planned and commanded by Vice Admiral William McRaven, UT School of Journalism, Class of 1977. Clearly, Admiral McRaven's service is invaluable—and it could not be gleaned from his starting salary 34 years ago. Admiral McRaven is one more example that—what starts here *truly* changes the world.

Today I have discussed the value of a research university and why we simply must preserve the special teaching and research ecosystem that exists on our campus. Our vision includes a strong commitment to undergraduate teaching…to harnessing technology to deepen and enrich the learning experience…to greater efficiency in all our operations…to developing new revenue streams…and to strengthening our research enterprise to expand the Texas economy to improve life in America and beyond. The question is *how* we change in pursuit of those goals.

The stakes are high. We're closer than ever to making UT the best. But if we make unwise choices, we can quickly squander 128 years of progress toward that goal. What is the cost to society if we fail to make positive change? At best, we grow less effective and less relevant, and at worst, we close the door of opportunity for thousands of Texas families who want to give their children affordable access to academic excellence.

So I will continue to work to educate the UT community, the public, our elected officials—and our critics—about the essential role our university must play in the future of Texas. We will continue to strengthen our disciplined culture of excellence and innovation.

I will continue to defend our Constitutional mandate to remain "a university of the first class." I will work night and day to achieve our vision for the public research university of the future. And I thank everyone in the Longhorn family for helping me do that.

What starts here changes the world. It's not just a slogan. It's the reality. Thank you for working with me to keep it that way.