

THE FUTURE OF THE PUBLIC RESEARCH UNIVERSITY

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Thank you for inviting me to address this distinguished gathering of university leaders.

When I am out discussing the serious challenges we face at our nation's public research and land grant universities – especially the declining support from state funding across the country – I am reminded by historians that there was a time when support was even less certain. In my home state of Texas in the late 19th century, State Senator James Armstrong of Jefferson County proclaimed, “I am no advocate of the University system. . . . Universities are the ovens to heat up and hatch all manner of vice, immorality, and crime.”

And in 1915, Texas Governor James Ferguson tried to persuade the Board of Regents to fire several faculty members at the fledgling University of Texas. When the Regents refused, the Governor vetoed nearly the entire state appropriation for the University. He famously said, “I do not care a damn what becomes of the University. The bats and hoot owls can roost in it for all I care.” Soon after that, the Governor was impeached, so the bats and hoot owls did not make the University their permanent home.

As I offer thoughts on the future of research universities, they are, in my strongest opinion, our nation's greatest treasure, and in most global academic discussions, still the envy of the world. Since 1940, the Vannevar Bush model has worked with outstanding success. Universities provide the basic research; industry or the government provides the applied research. To give you just two examples:

- The Manhattan Project utilized the theoretical research of university scientists from UC

Berkeley, Princeton, the University of Chicago, and other universities when they split the atom.

- The research of Dr. Judah Folkman at Harvard Medical School led to our understanding of tumor angiogenesis – the process by which a tumor attracts blood vessels to nourish itself and sustain its existence. Dr. Folkman worked with pharmaceutical companies to develop inhibitors for the treatment of cancer and wet macular degeneration.

And think about the model that has developed over the past 40 years – the research park. Visionary researchers have clustered in think tanks and research parks in close proximity to the sources of their inspiration: Silicon Valley near Stanford, Boston's Route 128, and the Research Triangle at Raleigh-Durham-Chapel Hill. Our research universities have become anchors for researchers and innovators. They have created a culture and an ecosystem in a familiar, comfortable, concentrated place with dramatic economic and societal impact.

Public research universities are great economic engines for their regions. Every state dollar invested in UT Austin, for example, generates \$18 in spending in the Texas economy. Combined external research funding at UT Austin and Texas A&M University exceeds \$1 billion annually. Like many of your universities, UT Austin is one of the largest employers in the city of Austin.

What I am illustrating is how the collaboration among the research university, industry, and government benefits our nation. For decades, the health of our society, stability of our

national security, and vibrancy of our economy have depended on this collaboration.

But we cannot assume that our past success will continue. Our universities are experiencing major challenges almost equal to those of the Great Depression. The increase in the National Debt is creating unpredictable funding streams from the federal government. Funding from state general revenue has been declining over the past two decades. UT Austin, for example, now receives only about 14 percent of its budget from state general revenue, compared to 47 percent in 1984. Most of us have experienced major losses of our endowment value, which may take 20 years to fully recover their earning capacity. As the APLU report suggested, universities are subsidizing more of their federal research because of an outdated cap of the indirect cost rate and burdensome compliance and regulatory rules. In 1981, principal investigators spent 17 percent of their time on administrative tasks, and today this has increased to 41 percent. And more often now, basic research is being pressured for immediate results, which compromises long-term investigations and discourages high risk, high impact research, because it may no longer be valued or supported.

In essence, what has taken the public research university more than a century to build can be destroyed in a short period of time if we don't maintain our vigilance. We can easily fall behind our global competitors in other countries that are heavily invested in their universities. Over the past 70 years, many of our STEM graduate students originated from foreign countries, and they have chosen to remain here to become outstanding professors and research scientists. Of the 493 Nobel Prizes in science and medicine awarded since 1940, 94 of the laureates were foreign-born researchers living in the United States and working for U.S. universities, medical centers, laboratories, and research institutes.

Today, 25 percent of the nearly 5 million university-educated scientists and engineers in the U.S. are foreign-born. But this pipeline will dry up as international universities become more attractive for graduate education. Ten years ago there were few international students in China, for example. Now there are more than 250,000 international students in China. The United States is no longer the only attractive option for a graduate degree.

Add to this pressure a number of new trends in graduate studies that need to be examined. The average debt of a Ph.D. graduate is \$75,000, and they can no longer be assured of a faculty position in the job market. Doctoral students are taking eight to ten years on average to complete their degrees, and they are 34 years old, on average, when they graduate. For most of us in this room, by age 34 our careers were well under way.

The U.S. is lagging behind in graduate degrees in the STEM fields, as I've already noted, and underrepresented minorities are not currently pursuing STEM degrees in sufficient numbers at a time that they are the most rapidly growing segment of our population. If this is not rectified, the future faculty of our American research universities will be compromised.

Six years ago in Texas, Senator Kay Bailey Hutchison and several educational leaders created The Academy of Medicine, Engineering, and Science of Texas – TAMEST – to foster the next generation of members of the National Academies in Texas, to recruit and retain great talent, and to increase communication among the state's best and brightest scientists. Members include Nobel laureates and more than 200 National Academy members. We extend our gratitude to the Senator for her leadership of science, not only in Texas, but for the entire U.S.

So what are our imperatives? How do we go forward? How do we keep the bats and hoot owls from roosting in our rafters? Let me

offer some observations.

America's research universities must be a state and national priority. And there must be a shared responsibility between the federal and state governments. We must continue to maintain a superb educational and research friendly environment, including the recruitment of the best and brightest faculty from around the world. Policies such as the banning of life-saving stem cell research will send our scientists to other countries where their work is more valued and supported. But even worse, may be a lost opportunity to cure disease and save lives.

Higher education should not be funded through discretionary funds, but through reliable, predictable funding based on benchmarks of success. In order to make up for declining state support, our public universities have been forced to raise tuition, which has adversely impacted many students and their families. We must find a better balance of leveraging funds between state and federal support, and support from our communities.

For the national good, the federal government should play a larger role in funding graduate education and the actual costs of federally sponsored research. Our states cannot bear the full costs because they are increasingly challenged to support undergraduate education and its infrastructure.

Our universities must stop mission creep. We cannot be all things to all people. We must stay disciplined and focused on the programs that are linked to our mission of education, research, and service. In these lean times, organizational, ineffective programs must be sunset, administrative units not directly impacting the core mission of the university must be eliminated. I know that this is difficult, but we have no choice. Internal resources must be used only for the advancement of excellence.

Matching grants should be optimized by state and federal government. In Texas we have several good examples in which our state leaders recognized the need for partnership:

- In our state, we currently have only three Tier One research universities: UT Austin, Texas A&M University, and Rice University. During the last Texas Legislative session, House Bill 51 set aside more than \$500 MM to help accelerate the movement of seven emerging research universities, including four from the University of Texas System, to Tier One status, as certain benchmarks are reached.
- The Cancer Prevention and Research Institute of Texas was approved by Texas voters to issue \$3 billion in general obligation bonds over ten years to fund grants for cancer research and prevention. The Institute will invest the grants strategically in cancer research, clinical trials, and laboratory construction.
- The Texas Emerging Technology Fund (ETF) invests state resources to attract outside funding for essential research. The fund rewards ideas born in university labs and moves them along the development pipeline into production and the marketplace. One element of the ETF – Research Superiority Grants – is designed to attract the brightest minds from around the world to Texas.

These kinds of matching funds incentivize research in high impact areas where there are urgent educational and societal needs.

While I have focused most of my remarks on research and graduate studies, this does not give a complete picture of the public research or land-grant university. Our undergraduate programs are core to our mission, and in most instances they are the focus of public attention by the media, lawmakers, alumni,

students and their families, and the people of our states. If we neglect the undergraduate experience, if we cut too deeply the departments and programs that educate the vast majority of our students, then we risk losing our fullness, our broad appeal, the entryway to a higher education for more than a century. And we will lose public sympathy.

When I walk onto a campus like the University of Texas at Austin, the University of California at Berkeley, Yale or Harvard, I do not immediately feel “science” or “research.” I feel a larger environment of learning where people live and work and teach and study a myriad of amazing things. I think about architecture and the arts and humanities, too, because they enrich our world view and teach us what is noble and good in the human spirit. Our campuses cannot lose their unique character.

There are a number of things we can do to strengthen our faculties. We should support young and talented faculty members with training grants and debt forgiveness. And we should not be lax in our tenure policies. They should strengthen the principles of continual improvement and productivity for all faculty. And we must ensure that our universities welcome young and rising stars where a long-term career can be achieved. The research university is a dynamic, evolving community of thinkers that must constantly reenergize itself and accommodate new and future generations of students critical for the creation of new knowledge.

We must also embrace innovation in our undergraduate curriculum. At UT Austin, for example, we’re offering first-year students to engage in authentic research with world-class researchers. Our Freshman Research Initiative has made it possible for 500 first-year students in the College of Natural Sciences to collaborate with seasoned researchers doing cutting-edge, original, and publishable research.

There are other adjustments that we ought to consider. Time to graduation needs to be improved. Creative thinking in instruction and delivery systems – using new technologies where appropriate – can help us address this challenge. For example, could high-demand introductory classes be offered online? Is our instruction too rigidly bound to the semester and quarter systems? Those of us involved in medical education are beginning to reassess how we are educating students in the health care professions. We are still teaching medicine the way it was taught a century ago. Some have suggested that we move away from the model of two years of science and two years of clinical work, which most medical schools still embrace. It may be time to re-imagine the curriculum of the public research university, as well.

Our gateway courses need to be improved. At the moment, too many of them are soul-crushing ordeals that destroy confidence and turn away enthusiastic young minds. We need to admit students for whom we can ensure have had enough preparation for a rigorous curriculum.

And one of the most pressing issues we’re facing as public research universities is our changing demographics. I grew up in the border city of Laredo, so this is an issue that is close to my heart. The Rio Grande River – the border between Texas and Mexico – takes up two-thirds of the U.S.’s entire border with Mexico. The University of Texas has 55,000 students in our System universities along the border. Since 2004, Texas has been a minority majority state. This fall, UT Austin welcomed the first entering class in our history that does not have a white majority. Fifty-two percent of our freshmen are minority students, including 23 percent who are Hispanic. We are providing educational opportunities to students who in earlier generations would not have had these opportunities.

And so the future has arrived. It is our responsibility as university leaders to not only ensure access and opportunity to all students, but to create a welcoming and supportive environment for every student we enroll. The time has come for us to embrace who we are: places of higher learning for the diversity of voices and faces that create the unique mosaic of our nation. It is incumbent upon us to inspire students from diverse backgrounds to pursue and succeed in STEM fields critical to the future innovation of our nation. If we do not do this, I can assure you we will not maintain our competitive edge as a nation.

“The University of Texas” holds a special meaning in my state. It stands for excellence, integrity, pride, tradition, and personal achievement. Our alumni have forged a strong, lifelong bond with UT Austin and the other outstanding universities in our system. Your universities do the same. Your name, your brand, your logo, your school mascot — they swell the heart. The people of our states look up to us, and we have a responsibility to meet their highest expectations.

If we profess elitism, if we isolate ourselves from society or disregard the public that funds our institutions, then we will receive no sympathy from them or their elected representatives when our budgets are on the chopping block. The public expects accountability and transparency. They expect us to put our own houses in order, to eliminate administrative sprawl, and to transform ourselves before we ask them for more financial support.

“Public confidence is the only real endowment of a public university,” declared H.Y. Benedict,

who served as president of UT Austin during the Depression years. Our greatest endowment is the public trust. We have a moral duty and responsibility to maintain that trust. If we do, we will keep the bats and hoot owls from roosting where great minds are hard at work in research, in scholarship, in outstanding teaching, learning, and public service.

It is during times when our nation faces great challenges that creativity must prevail and great innovations take place. This is an optimal time for us to do this within our own universities. We must work to prioritize opportunities to advance our universities and health institutions to serve our students and society better. Whether making new investments in high-performance computing to allow for higher degrees of collaborations between UT institutions and universities all over the world, singling out the importance of engineering to our future, offering new and creative ways for students to earn degrees, or navigating through one of the most exciting times in medical discoveries, this is our time.

Thank you for inviting me to address you today. It has been my great personal pleasure.

