



Securing the Future for American Research Universities

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Thank you so much for the honor of talking with you today.

What a propitious time for us to be meeting this weekend, with two days left before Election Day. The outcome of this particular Election Day—nationally, regionally, and locally—has enormous implications for our future, regardless of which political candidate you may be supporting.

A feeling of great anticipation absolutely fills the air here. This is a perfect backdrop against which to have this meeting of the minds, and I could not be more delighted that our conference organizers picked Washington, DC for us to gather.

Our world, our nation, our respective states, and our universities have been operating within fragile paradigms that have, as you are keenly aware, begun to collapse around us.

The tumultuous stresses in our environment—be they stresses to our physical environment, our economic environment, our political environment, or our cultural environment—require us as university leaders to be at the forefront of providing answers, and providing them fast.

Now eight years into the 21st century, how do we transform what may be old, 20th-century mindsets and practices into ones that best enable us to meet future societal demands?

When we pick up a newspaper on any given day in the last two months we find evidence of regional factionalism, financial crises, polarizing rhetoric. How do we not become overwhelmed or paralyzed in our thinking and actions?

How indeed?

Ladies and gentlemen, no one has ever been better suited to answer questions of “how” than America’s premier research universities. And at no point in our lifetimes have we felt the call to provide humanity with those answers more urgently than right now.

Conversely, at no point in our careers have we had a tougher time sustaining our research capacities so we can find those answers.

For our part, we research universities have our own set of “how” questions to which we urgently need answers if we are to give humanity the full benefit of our potential.

How are we expected to answer bigger, more pressing challenges with fewer available dollars?

Let us not construe this question to be the whiney lament of university administrators. We *get* the financial crisis and all of its complexities because we live with it every day.

We live with the headache of meeting increased fixed costs to run our universities while our state legislatures continue divesting from our enterprises, and our students and parents push away from further tuition increases.

But the fact is that the challenges we will be asked to meet are mounting. The clock is ticking. And we are financially stretched to our limits.

In Arizona, higher education’s share of the state operating budget has shrunk from more than 16 percent to under 10 percent over the last 20 years. State dollars account for less than 33 percent of our operating budget.

Federal and private dollars, which now outnumber state dollars at The University of Arizona, have flatlined for us all. Political deadlocks have NIH, NSF, NASA, and the Department of Energy operating under a continuing resolution through the spring.

And we have no idea what the spring holds, as the economy continues to teeter, the national debt passes \$12 trillion, and the nation steels itself to face these problems and apply substantive remedies to a government that has lived well beyond its own means for far too long.

How, if we are to move quickly and respond more rapidly to challenges as they arise, can we do this under an ever-increasing burden of compliance regulations?

Of all the people involved in funding, conducting, and sharing the benefits of university research, no one is more concerned about quality and safety than we are. We understand the need for compliance to the rules of those who fund our research.

But we cannot give people, businesses, and governments the answers they want when they want them if we continue to be saddled with labyrinthine compliance rules that do little more than satisfy a distant bureaucracy's need to feel as though some sort of due diligence has been exercised.

And finally, how can we encourage robust, unfettered pursuit of scientific discovery when government leaders who are part of our funding source engage in anti-intellectual attacks on the integrity of our researchers for partisan political gain?

Attacking the pursuit of truth because it proves to be, to borrow a word—*inconvenient*—seems to have receded from the high water mark it reached earlier in this decade. But while attacks have subsided in Congress, they continue to occur in other arenas.

For The University of Arizona, the single most distasteful attack we have ever had to endure came in 2005, when a Congressman from Texas challenged the research of our own Professor Malcolm Hughes, an internationally renowned expert in using tree ring analysis to track millennia of climate patterns.

His research contributed to the growing chorus of scientific analyses that were showing that current climate fluctuations are sharply anomalous, and that the so-called hockey stick graph of temperature change can only be caused by human activity.

In other words: global climate change is real, and it coincides with humanity's use of fossil fuels.

You can just imagine how the Texas Congressman reacted to this news. Maybe you read about his crusade.

First, he produced his own research ostensibly "proving" that climate change was a hoax. That "research" was in fact bought and paid for by a Texas-based oil company.

Next, he demanded that Professor Hughes turn over every scintilla of raw data ever collected for every scholarly paper he had ever authored—even that which came from England, where Dr. Hughes was born and began his academic career.

And finally, he tried to haul Dr. Hughes in front of a congressional subcommittee to defend the assertions of his research.

This Congressman's shenanigans were stopped before he could publicly pin the scarlet "A" to Dr. Hughes' shirt, but his intentions were obvious: Destroy this professor's career as a warning to others to stop research that flies in the face of the dominant political dogma of the day.

I am proud to tell you that the epilogue to this story is positive: Dr. Hughes is still thriving, unbowed, in his research. For the excellence of that research, the Arizona Board of Regents has bestowed on him its highest honor—the title of Regents Professor.

Blatant attacks on academic freedom aside, we continue to feel more subtle, equally insidious efforts to control the free hand of research, and this has to stop.

These are “grand challenges” that we face as leaders of research enterprises. We will ask much of the governments that in turn are sure to expect much from us.

But there are some realities about our own operations that must be confronted. And these realities are driven by the central truth that academic research is not, and will not become, a growth industry. It’s just too expensive.

So we must take three steps to make a case that will be compelling in the new political reality that is taking shape in this town if we are to be heard and taken seriously.

STEP NO. 1: NO WHINING

To command the respect of our funders, federal and otherwise, we must earn back the microphone. Simply complaining about anemic funding and onerous regulatory burdens won’t cut it.

Look around. Life has been unfair to a lot of people lately, nearly all of whom are less fortunate than we. Beyond articulating the problems we have experienced, we must articulate a willingness to thrive within the new reality of a federal government buried in debt, battlefronts in Iraq and Afghanistan, and a global economy sinking into recession.

No petition of complaints will be taken seriously without the offer of solutions that match the realities of the day.

STEP 2: MAKE “INTERDISCIPLINARY” REAL THROUGH INNOVATION AND COLLABORATION

“Interdisciplinary” is a word that is overused and under-enacted. It is in danger of going the way of “sustainability,” a word so hackneyed by every university wishing to cash in on its cachet that it has become meaningless.

Let’s revive “interdisciplinary” and give it some real meaning and depth.

The traditional approach to winning research dollars—tackling issues apropos of single disciplines, pursued by individual professors or even individual institutions—is fast moving toward extinction.

Grant trends are rapidly shifting away from awards to individual scientists and toward awards to centers of excellence.

Those universities that can move quickly to form centers of excellence that respond to critical societal needs, and have the willingness to share the money, control, and credit with other institutions, are increasingly winning grant competitions.

So we have got to get better at teaming up. Widen the scope of our ambitions. Move quickly. Form, de-camp and re-form to fit the needs of our communities.

And we should bear in mind that with the necessity of sharing the dollars, credit, and control of our research, we will also share in the joy of common discovery.

The University of Arizona has the good fortune of about three decades of an interdisciplinary approach to our research, but not because we were particularly prophetic in the 1970s.

Rather, this way of life was the natural cultural evolution of a university that had been a quiet, informal desert institution at which intellectuals came to pursue their interests, free from decades or centuries of entropy that bogged down other universities.

You might say we were interdisciplinary before being interdisciplinary was cool—certainly before it was lucrative.

All that has changed in recent years, as a paucity of resources has forced everyone to innovate. This approach led us to create an interdisciplinary center of excellence in the biosciences that includes disciplines across 11 of our 18 colleges.

The BIO5 Institute includes faculty from basic sciences, agriculture, engineering, pharmacy, medicine, and now many more areas. Its mission is as easy to articulate as it is daunting to fulfill: to treat disease, feed humanity, and preserve livable environments.

Its building is designed like none other, with no detail spared to ensure people, laboratories, and offices engage in regular “intellectual collisions” that produce a truly silo-free environment of discovery.

Earlier this year, BIO5 leaders won a \$50 million NSF award to lead a consortium in creating the iPlant Collaborative—a joint endeavor with Cold Spring Harbor Laboratories, Arizona State University, the University of North Carolina at Wilmington, and Purdue University.

The charge: create an unprecedented cyberplatform to unify the world’s various stripes of plant scientists to address the grand challenges of plant life on earth. The grant includes the expectation of quick and big advances in this arena, and it holds the potential of another \$50 million grant for five additional years if we accomplish this goal.

The message from the NSF was obvious: change the game by working across disciplines and institutional boundaries to achieve bigger, quicker wins, and you win the grant.

The University of Arizona team combines the talents of our luminaries in plant sciences, management information systems, and mathematics. But the BIO5 building itself was a star performer. The very design of the building was cited by the NSF Director as an attribute that set The University of Arizona apart from every other competitor, and ultimately helped to win the grant.

Of course, this gives me a tremendous amount of pride as the UA president, but it also makes me look anew at our research facilities and at the very organizational structure of our university and ask myself—how we can replicate this success across other disciplines?

We can't afford to just keep building funky buildings that change the work culture of our research faculty, though that would be fun, wouldn't it?

We have got to find new ways of working with what we have to adapt to this new reality.

And we have to look at each other less as competitors and more as collaborators.

STEP 3: LOOK, AND LISTEN, TO THE PRIVATE SECTOR

We all work with the business organizations with which we share a community or some other common interest. In Tucson, we enjoy a broad and deep relationship with Raytheon, which headquarters its missile systems there and hires more engineers from The University of Arizona than from any other university.

In Raytheon we have a collaborator in research, economic development, and workforce development—it all ties together.

As you can imagine, this relationship is the exception for us, and not the rule. Sadly, such is the case at most universities, I suspect.

As America's universities are finally recognized by the political class as the engines of economic development that you and I always knew they were, it is important that we lead the way toward forming deeper ties with the business sector that nonetheless make sense for educational and research enterprises.

It does not make sense to partner with businesses if those partnerships only enhance a single profit margin. But it does make sense to do so if those partnerships advance an industry, a community, or the student body we are educating to join the workforce.

In Tucson, Raytheon is iconic as a manufacturer of guided missiles, but our association with this company is not an exercise in smart bomb development.

Leaving aside all of the obvious partnership opportunities between Raytheon and the UA, the depth and breadth of our relationship has led us to some fascinating arenas of discovery.

Without stealing our own thunder, let me tip my hand just a little and say that we are preparing to announce next month a Raytheon collaboration involving, of all things, the fight against skin cancer.

Given that southern Arizona is second only to Queensland, Australia for the incidence of skin cancer, this is a relationship that has borne fruit in an exciting and quite unexpected way.

The same is true about our relationships with Arizona's mining companies. They and the communities that exist nearby them have articulated to us—and sometimes to anyone who will listen—what they need to secure a responsible future for mining in Arizona.

The modern mining conversation in Arizona is often a pitched battle between rural communities struggling to recreate the booming economies that copper mining created a century ago, and modern communities dead set against new mining that brings with it environmental degradation, voracious consumption of precious groundwater, and enormous scars on our beloved landscape.

Through a lot of conversation, listening, and creative thinking, we have found a third way.

Later this month we will announce a major research partnership with Arizona mining companies that holds the very real promise of revitalizing this industry for the 21st century in a way that will provide safer, higher-skill jobs than rural communities have ever seen, minimize the environmental impact on mining operations, and minimize or even eliminate the need to use potable water in the leaching process. Combined with this effort will be the creation of a new STEM training center at the Biosphere 2, which we now operate, which will give our schools the boost they need to prepare students for the high-skill, safer, and cleaner jobs to be created in this new era of mining.

We will be one of just three universities in the world with the portfolio of research and development capacities we are about to announce.

Again, each of you surely has an example just like this percolating at your university, and you should. But I'm willing to bet that for all of us, these examples are the exception and not the rule with respect to our interactions with the business sector.

And as we bind these logical ties between our institutions and industry, we must include a robust student component. We can and must be their bridge to the workforce, and we can be a very reliable bridge when we approach our business relationships with an eye toward one of the things our business partners want—a steady pipeline of highly skilled workers.

Let me recap our three steps.

- Step 1: No whining
- Step 2: Innovate and collaborate
- Step 3: Connect more deeply with the business sector

This is our roadmap for establishing a credible new relationship with a government that is headed into largely uncharted waters in the coming years.

If we demonstrate, with competence, confidence, and consistency, that we are doing these three things as we respond to the call to deliver answers to a world full of worrisome questions, we will be ideally positioned for even the most uncertain future.

Our mighty research engines are showcases for the best of what humanity has to offer itself and this world. In our laboratories, and inside some impressive minds, the most puzzling riddles and the most maddening mysteries of the universe are giving up their secrets to our scholars.

They reveal cures for disease, solutions for environmental conundrums, the origins of our universe, the complexities of the human mind, and the complex beauty of the order of life on Earth.

For years—long before the general public tuned in—we have been hard at work on some of the greatest questions and most alarming problems that loom in our future. I fervently believe that the public and the body politic have caught up with us and are paying attention to what we have been saying about disease, climate change, and the future of an ever more crowded and globalized planet.

What we have always felt implicitly is what we are now hearing explicitly, in language that is clearer and more urgent: It is the call to serve humanity. It is that same call that drew us into our line of work in the first place, many years ago when we were undergraduates.

And in hearing that very clear call to serve, we find ourselves, once again, stirred to find a way to do what we have dedicated our lives to doing—serve as the wellspring of answers to humanity’s challenges.

ABOUT THE AUTHOR

Dr. Robert N. Shelton is the 19th president of The University of Arizona. In 2006 he came to the UA from the University of North Carolina at Chapel Hill where he was Executive Vice Chancellor and Provost for five years.

Dr. Shelton is leading The University of Arizona in its quest to advance its standing as one of the country’s top public research universities. His focus is on continuing to enhance the overall quality of the University, while increasing diversity and ensuring that the UA is accessible to Arizona students, particularly first-generation college students.