KEY POINTS

- American research universities dominate the group of the most distinguished universities in the world. They are the world's most powerful engines of innovation, discovery and new knowledge.
- America's enlightened post-WWII science policy—allocating federal, taxpayer funds to support fundamental research through our universities—strengthened American universities and launched them towards greatness.
- Yet, our nation's research universities are somewhat fragile institutions. Threats to American universities, both internal and external, are jeopardizing the preeminence of this jewel in the nation's crown. Perhaps most threatening are the severe, short-sighted budget cuts that are dismantling some of the great public universities in the country.
- The United States should be able to maintain the preeminence of its research universities. Perhaps most hopeful is the enormous unrealized potential they possess. Whether that potential will be realized, though, is an open question.

The Great American University: Maintaining Our Preeminence

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American research universities are arguably the world's most powerful engines of innovation and discovery. Yet they are widely misunderstood and in danger of losing their capacity to drive economic progress and improve our lives. Jonathan Cole, John Mitchell Mason University Professor at Columbia University, notes that the preeminence of American universities was not preordained, but rather a result of intentional policies that provided the structure, values and support that allowed American universities to flourish within the last century. Cole's book, *The Great American University*, details American universities' rise to preeminence; provides ample evidence of the new knowledge and life-changing discoveries flowing from them; and discusses the threats—internal as well as external—to their continued preeminence. Cole presents a reasoned and eloquent argument for the need to sustain and enhance the American tradition of excellence in higher education, so as to preserve this powerful national resource. Excerpts of Cole's remarks at the Forum's 2010 Aspen Symposium are reprinted here.

I'd like to highlight a few features about *The Great American University*, but first let me begin with the following observation: When most educated Americans, graduates of our universities, think about great universities, they simply don't think that lasers, the FM radio, magnetic resonance imaging, global positioning systems, bar codes, the algorithm for Google, the fetal monitor, the Nicotine patch, antibiotics, the Richter scale, nanotechnology, the discovery of the insulin gene, the origin of computers, bioengineering through the discovery of recombinant DNA, improved weather forecasting, the pap smear, scientific agriculture, methods of surveying public opinion, the concepts of congestion pricing, human capital, and the self-fulfilling prophecy all had their origins at our research universities.

Even, I want you to know, the electric toothbrush, Gatorade, the Heimlich maneuver, and Viagra had their origins at our great American universities. Yet when most members of the educated public think of these universities, they think in terms of undergraduate and professional education, of teaching and the transmission of knowledge, rather than the creation of new knowledge. They're also concerned with the education of their children, or their grandchildren, or they relate to their own educational experiences from the past. This point of view is entirely understandable. For one, we, the

leaders of higher education, have not taught them otherwise. We haven't educated them as well as we might. But what has made our great universities the best in the world has not been the quality of our undergraduate education or our ability to transmit knowledge. I want to emphasize that the teaching of undergraduates and graduate students is critically important and an integral part of the mission of great universities. Some of our institutions do it very well; others, in a less distinguished way. But the fulfillment of the undergraduate teaching mission is not what has made our universities the best in the world. Rather, what has made them the best is their ability to fulfill one of the other central missions of great universities: the production of new knowledge through discoveries that change our lives and that change the world.

What evidence do I have that American universities are the best in the world? I can draw upon many, many sources, probably the least of which is the annual surveys that are done in China or in the U.K. that essentially have the U.S. holding 80 percent of the positions among the top 20 universities in the world; 75 percent of the top 50; and 60 percent of the top 100.

In short, threats to our preeminent universities represent nothing less than threats to the nation, and we had better begin to think of our investments in them—in both the research they do and their students—as mandatory rather than discretionary funding.

And I want to just point out that today there's not one German university in the top 50, not one Russian university in the top 75 and, by their own accounting, not one Chinese university in the top 200.

One can find many other indicators of the same kind of preeminence: 60 percent of all Nobel prizes in science since World War II have gone to Americans or foreign nationals working in American universities. If you look at the citation patterns in the literature of almost all disciplines, you will find Americans dominating the most cited articles, the most influential papers.

American universities have become the envy of the world because many of the brightest young people want to come here to be participants in the discoveries that we make. It is probably the only industry today in which the United States has a favorable balance of trade.

The Great American University

The central messages and themes of *The Great American University* can be summarized fairly succinctly. First of all, ours is a young system. We tend to think of the American universities going back to Harvard's founding in 1636—and by the way Harvard was not the first university, the first one failed—but this is not really true. It is quite a young system.

By the 1930s, the core values of the American higher education system were in place, and the structures that were built upon these values were also pretty well-established. The takeoff really begins in January 1933, when Hitler came to power in Germany. During the first three decades of the 20th century, the Germans dominated higher learning. They won the majority of Nobel prizes, they were among the most high-ranking institutions, they were the envy of the world, just as we have become. But with just a few pieces of legislation, the German system of higher learning was destroyed within a matter of months. And there began a process of intellectual migration both to England and to the United States of scholars, scientists and engineers, that had an enormously positive effect on the growth and takeoff of American universities towards greatness.

And when you add to this an extraordinarily enlightened post-World War II science policy, the growing distinction and preeminence of American universities began to become clear.

During World War II, for the first time, Americans participated in big science—huge science. When Fred Terman, for example, temporarily left Stanford to take up residence at Harvard, he led a group of more than 800 scientists at the Radio Research Lab, focusing on countermeasures such as jamming the enemies' radio signals. That group was far larger than the entire Stanford faculty at the time.

It was Vannevar Bush who coordinated the use of university professors during the war effort and had more to do with strategic development of these projects than anybody else. As the war was coming to a close, President Roosevelt asked Bush what should be done after the war for American science and American technology. In response, Bush oversaw preparation of an extraordinary treatise called "Science: The Endless Frontier," which became the basis for science policy immediately after the war and for the following 40 years.

The Endless Frontier recommended creation of an independent agency—slightly parallel to the government—with an endowment that would fund basic fundamental science after the war. Bush wanted to create a national research foundation. After congressional hearings, that idea morphed into the National Science Foundation, which was opened in 1950. We also see the restructuring of the National Institutes of Health, which happens in 1948.

The critical factors were really these: For the first time, the United States was going to use public taxpayer dollars to support fundamental research through our universities. Bush wanted to outsource science to the universities and colleges and *not* build an infrastructure of government-based science, as was happening in Europe. He wanted to have a peer-review system that would determine the quality of proposals and projects and those that had the most promise. He wanted to link teaching and research missions and labs, something that's absent in most of the European universities even today.

Bush wanted to set priorities and produce discoveries that would change the quality of our lives through their applications downstream. His was a very linear model. And that actually came to pass with the National Science Foundation and the National Institutes of Health, which had enormous influence because of the resources involved in the development of our universities.

Bush's extraordinary vision gave tremendous impetus to and strengthened the American universities. But it is also true that our great universities are rather fragile institutions and that they periodically come under attack. Recent attacks now threaten the preeminence of this jewel in the nation's crown.

There are three parts to *The Great American University*. The first part is about the rise to preeminence. The second part is the evidence, the great discoveries that have come out of these universities that have changed our lives—both fundamental and very practical-oriented discoveries not only in the physical sciences but in the biomedical sciences, the social sciences, and the humanities as well. Our great universities have become the engine of innovation and change in our world. Together with industry, the future of our national welfare and our economy depends upon the nation's support and improvement of the best of our seats of higher learning. If we strangle those universities or undermine the fundamental values that govern them, we will place them in two types of threats. First, there will in due course be the threat from foreign competition. Second, we will find our universities struggling to make ends meet and unable to afford the kinds of research that will allow them to achieve more of the enormous unrealized potential that they still have.

The third part of the book is about threats to the preeminence of American universities. In short, threats to our preeminent universities represent nothing less than threats to the nation, and we had better begin to think of our investments in them—in both the research they do and their students—as mandatory rather than discretionary funding. If the nation is ill it is not only because of diseases affecting our population and the absence of adequate health care, it is also because of our inability to sustain exceptional K-12 education that acts as a pipeline to our great universities. Thus, it is critical that we attend to some of the present threats to the excellence of our best universities.

Threats to Preeminence

Let me shift from the situation that we have been in, which is dominating this world of discovery and dominating the group of most distinguished universities in the world. Why do I say that I think we're under threat?

For a number of reasons, which fall into at least two general categories. One is competition from abroad. Many people today talk about the challenges from the university systems in China and India, Japan and Korea, as well as Europe. Foreign competition isn't really an imminent problem. In the longer term, 25 to 50 years from now, I have no doubt that China and India will create great universities. By the way, having them create those great universities is not a bad thing for us. It will increase international competition. And it doesn't matter whether we no longer have 80 percent of the top 20 universities in the world, or 70 percent of the top 50, if the pool of great universities increases. If we have a lesser percentage of them, so be it. The point is that the number of discoveries that are not only of a fundamental nature, but that will solve the huge social issues that we face, the problems of disease, and all kinds of issues having to do with economic growth and development, and so on, will increase.

It is not a bad thing if other countries create great universities. It will put us in a competitive situation in which I think we would do well. To the extent that we develop collaborative relationships with these great universities in other countries, we will have produced at least one mechanism that will reduce the likelihood of conflict between nations. Nonetheless, I don't think their rise is imminent because I don't think either the Europeans or the Asians have either the structures or values that at the moment can compete with the American system.

So where do the threats come from? As far as I'm concerned, to paraphrase from Walt Kelly's wonderful cartoon character Pogo, the enemy is us. And the enemy is us in two forms. First, there are external threats to the universities, and then there are the threats that are internal to the universities.

External Threats

When the government becomes deeply involved with universities, trying to set its policies or prohibit certain kinds of research, it's not good for universities. It doesn't bode well. In the past decade Congress has, for example, adopted antiterrorist legislation—namely, the USA PATRIOT Act and the Public Health Security and Bioterrorism Preparedness and Response Act of 2001 and 2002. The attacks on the universities,

from the federal government in this case, aren't in the form of attacks on speech like during the McCarthy period. They are instead attacks on research. That's a new business the government is getting into.

What do these pieces of legislation do? They place certain kinds of restrictions on the work of immunologists, for example. I don't know how many of you are familiar with the case of Thomas Butler. Thomas Butler was one of the leading immunologists in the world, working on plague. He had been working for 25 years in Tanzania and brought back specimens of plague to his laboratories at Texas Tech University.

Now, these are potentially very dangerous stuff, lethal. You want to know where they are and you want to be able to control their use, and you don't want them to get into the wrong hands. However, when you place certain kinds of restrictions on their use, you're going to impede research. And that's what they did with Butler.

Butler had informed his university that some amount of the materials that he was working with had disappeared, had been lost. Probably thrown away in some way; not good, but nonetheless, thrown away, disposed of.

The FBI came in and searched his lab. They scoured his files and they indicted Butler on about 15 counts of violations of the PATRIOT Act, having to do with moving the materials—which he had been moving for 25 years—without the proper authorization. And then they added on about 65 charges of tax evasion, things that they had determined from looking at the rest of his files in his laboratory at Texas Tech.

Butler went to trial. He was defended by the National Academy and others. He was sentenced to nine years in prison—not for the violations and the indictments that were linked to the PATRIOT Act, but for tax evasion, the add-on charges that basically had nothing to do with his research involving plague.

When this happened, a whole series of people doing immunological research said, wait a second, we're not sure we can work under these conditions. The conditions weren't only that the FBI was watching and putting real constraints on the work, but constraints were also imposed on who universities could hire to work in their laboratories. The government was actually saying, you cannot have students in your laboratory who come from Cuba, who come from Iran, who come from a variety of different countries. Robert Richardson, the Nobel prizewinner at Cornell, said that before the PATRIOT Act was passed and the government began to intrude in their work, there were 38 laboratories at Cornell working in immunological areas on a variety of scourges and trying to find cures and vaccines for them. Two years later, there were only two laboratories at Cornell working in these areas. The scientists research foci shifted; they abandoned their work with select agents. They didn't need to work on those kinds of problems if they were going to be subjected to those conditions, including being indicted for criminal behavior.

We have to remember that the public universities are now the greatest source of social mobility in this country, far outpacing the privates. We also have to remember that if we are very shortsighted and starve them, it is infinitely more difficult to recreate greatness once it is lost than to hold onto it while it is here—and much more costly too.

The government also got involved through antiterrorist legislation in the work of librarians, for example. Federal agents could go into libraries and access computer records, e-mail records, and lending records from the library. And there were gag orders placed on the librarians, preventing them from informing you that you were a subject of investigation by the government.

There were also real efforts by the government to restrict, if not censor, scientific publication—especially in those areas where the government believed there was a possibility of information that could get into the hands of potential terrorists. The National Academy released a work on why this was fruitless, why it wouldn't serve any real purpose. And yet, at the time, a set of journal editors actually agreed to review articles and take out sections that someone might potentially misuse—this in a world of international science, by the way, where anyone could get the same information from other publications and other places in the world.

What are some other ways in which the government intruded in research? Embryonic stem cell research is one. And it wasn't only embryonic stem cell research and the limited numbers of stem cell lines that could be developed, but it was also the politicization of the bioethics committee. For example, Dr. Elizabeth Blackburn of UCSF was essentially asked to leave the committee because of her views on a variety of these subjects. A year or two later, she won the Nobel prize.

There's more:

Efforts were made to constrain and even doctor and censor scientific reports written by Jim Hansen, who is perhaps one of the top five, 10, foremost climatologists in the world, who worked for NASA at the Goddard Space Institute, and at Columbia.

Efforts were made to alter websites, like the CDC's website on reproductive health and HIV; taking information off that website about condoms and how condoms could be used to prevent the spread of HIV.

Efforts were made to intrude into the peer-review system, for example, Title VI grants having to do with foreign language study. A lot of that had to do with Middle East study. The study of foreign cultures and languages has been in a sorry state in our country. One only needs to know how few of those at the CIA after 9/11 actually spoke Arabic. But the Bush administration believed that these area studies programs were hotbeds of radical, anti-American thought. This idea was reinforced by external, free-standing conservative think tanks. Proposals were made and given very serious consideration in Congress to take non-expert political appointees and have them monitor the curriculum of these schools of international studies at our major universities.

In short, there were efforts by the government to intrude on a variety of forms of academic freedom and free inquiry. I should add that none of the legislation referred to in this list has been repealed. It's still on the books. It's still being used.

Another very real threat we face is the potential dismantling of the great public university systems in higher education. The case of the University of California has been in the forefront of the news in recent years. The response to the fiscal crisis by state legislators there is unbelievably shortsighted, and it is beginning to starve that system.

If you look at California, you'll find four of the top 20 or so universities in the world: Berkeley, UCLA, UC-San Diego, and the University of California, San Francisco medical school. They're all viewed as among the very, very best universities in the world. And yet, these universities are being starved. The state legislators are dismantling Clark Kerr's great California plan, which was to give access to people who couldn't otherwise afford to go to college and to simultaneously create some of the greatest research universities in the world. California has been spending more money on its prisons than on higher education.

The starvation of the state university system is happening not only in California. Arizona had a 22 percent cut in state support, and today the University of Michigan receives about 12 percent of its budget from the state of Michigan. But at the margins, those 12 percent can make a big difference, leading to faculty salary freezes and furloughs, an inability to compete with other universities for the best faculty and graduate students, and an increased reliance on out-of-state undergraduates who are willing to pay far higher tuition to attend these schools.

We have to remember that the public universities are now the greatest source of social mobility in this country, far outpacing the privates. We also have to remember that if we are very shortsighted and starve them, it is infinitely more difficult to recreate greatness once it is lost than to hold onto it while it is here—and much more costly too. We could lose these great universities and all of the externalities that flow from them.

After all, if the great professors move to other institutions—and don't think that Harvard and Chicago and others aren't lining up to recruit them—then the best graduate students, postdoctoral fellows, will no longer go there. The billions of dollars from the federal government to support research won't flow to California. New companies will not flow from them. The civic pride associated with having a great university system will dissipate and go away. And so there is a great threat from what is happening at the state levels.

Internal Threats

Now we cannot omit ourselves from this equation. There are internal factors at universities that can undermine our own greatness, one of which is the mixed blessing of the commercialization of intellectual property. There is enormous upside potential for this. And why, after all, shouldn't universities benefit rather than, for example, pharmaceutical companies? Why shouldn't universities reap some returns from discoveries to plow back into the university, particularly into those areas that can't make these kinds of discoveries—into the humanities, into the social sciences?

But there is also potential for conflicts of interest and the erosion of one of the essential values of universities; that is, the value of disinterestedness, the idea that you would not profit from your own discoveries. The value of disinterestedness, which can be traced back to 17th century science and the science in America of the early 20th century, has been eroding..

Most universities are interested in commercializing intellectual property, as they see it as another important revenue stream that will help them innovate and increase their quality. The question is, do they have sufficient internal controls on potential conflicts of interests to make sure that the core values of the universities remain in place? Maintaining robust and tough conflict-of-interest policies are essential if universities are not going to slowly begin to sell their souls to the devil.

Another internal problem is that of growing inequality of wealth within the university system. Despite the fact that the major private endowments have been hard hit, if you think about the markets re-equilibrating themselves and endowments doubling every seven to 10 years, and if Harvard begins with only $25 billion rather than $36 billion, and Columbia begins with $6 rather than $8 billion, then the inequality is compounded in the doublings: $50 versus $12 billion; $100 versus $24 billion. The gap widens.

The question is, what happens to the great universities competing within the system? Competition is very beneficial, certainly up to a point. But what happens when the University of Chicago, Columbia, Penn, and others, become in a sense farm systems for the great scientists and scholars, feeding just a handful of universities (which would make us roughly equivalent to what has actually occurred in England)?

That's a problem that has no easy solution, by the way. Government taxing of endowments would be extremely unwise and would undermine the financial aid policies of the wealthier universities that are in a position to allow extraordinarily talented students without financial means to benefit from great educations. I certainly don't think, for example, that we're going to tax the richer schools in the Ivy League to help the poorer schools so that we can have an even playing field—not in soccer or football, nor in biology or English for that matter.

There are other internal issues as well. One is that we have big problems that require big solutions and structural changes. For example, our system of budgeting and organizing university finances. The decentralization model, which took over much of higher education in the 1980s and '90s, is actually dysfunctional in terms of supporting the growth of knowledge. The question is, does decentralization—tubs on their own bottoms—put fetters on the growth of knowledge, which depends increasingly on collaborations across departments, across schools, and across the entire university? If it is true that we're going to more rapidly reach solutions to the major social problems we face through these kinds of collaborations, how can we foster them economically within the university? By creating budget and financial systems that support, rather than impede, collaborative exchanges and growth.

Another internal problem, one we simply have to face directly, is what I would call the "herd of independent minds." That is, the tendency towards intellectual orthodoxy. We talk a lot about free discourse, free inquiry, and academic freedom at universities. But I think we have to admit that there are subjects that we simply cannot fully discuss at universities. We cannot actually have certain kinds of radical ideas that are tested with evidence because the people who offer those ideas feel that they will be under attack if they offer them, and will not necessarily be supported by their leadership.

Intellectual courage is not found in super-abundant quantities at universities. We're no different from anywhere else in that regard. We need more intellectual courage, more leadership—to recognize, as Max Weber said, inconvenient facts. We need to create a meritocracy of ideas, where people are valued and evaluated on the basis of their ideas, not on whether they conform to any preordained political correctness or intellectual orthodoxy. And that is true, by the way, for the sciences as well as for the humanities and the social sciences.

Conclusion

There are many good reasons why the United States should be able, in fact, to maintain its dominant position among preeminent research universities in the world. Foremost is that there continues to be an enormous unrealized potential within the system.

And when I say there are "threats," I want to be very clear about one thing: It's not the threat that Harvard, Columbia, Chicago or Berkeley will no longer exist, or that they'll become third-tier institutions. It is a threat to the maximization of their potential, the unrealized potential of our great universities, that which has not yet been achieved. There is enormous unrealized potential in these institutions. And to the extent that the slope of the line becomes lower and much more gradual in its inflection, perhaps even slightly negative, then we are under threat of losing not only our greatness but the potential to be still greater.

We should not fear foreign competition, which I believe is not imminent, for one, and once it emerges, it will actually be good for the international system of higher learning and good for the growth of knowledge.

But there really are choices to be made. And I believe we're capable of blowing it. If we follow the path being taken by many states in dealing with their great universities, we may well lose the luster that we have. That is the great test that we face, and it remains an open question whether we'll pass it.

Discussion

Speaker: Do you take the position that, in a sense, a great university is indivisibly great; that a great university doesn't specialize in just some areas?

Mr. Cole: That's an extremely interesting question. I think in some sense it's divisible, but it's very difficult to sustain a culture of greatness, wherein the ethos of the university supports and sustains greatness throughout, when you have only very few places within that university that have that culture and set of values.

On a systemic level, it's important to recognize that if we had a highly differentiated structure in which there were only a few schools that are extraordinary in certain areas, I think that would reduce the number of extraordinarily talented people looking at career opportunities in academic life.

In other words, if there are very few positions available and they see themselves as competing against everybody in the world for these very few positions—for example, they have enormous talent and want to be a professor of physics at Harvard—and they say, well, what are my odds of being one of

the 20? Well, the odds are very low, and so instead they'll go into business or finance or something else. And so we have to look at how that could constrain opportunity structures and create unanticipated consequences for the flow of talent itself.

How do we predict who's going to make life-changing discoveries? We can't. There's a necessity for some redundancy in the system so that it works optimally. We have to be careful about closing down the opportunity structure by differentiating universities that do a few things particularly well because we could lose extraordinary talent that wouldn't go into a field in the first place.

Speaker: What do you think about tradeoffs in public subsidies for research versus for teaching?

Mr. Cole: I think that what makes universities truly great is the knowledge that comes forth from them. There are also studies which show that although there is not a high positive correlation between the two, there is nonetheless a positive correlation between student evaluations of the quality of teaching and the research performance of the people who are doing that teaching. So in general, students perceive people who are extraordinary researchers as also being very effective and good teachers. So it may not be such a tradeoff.

Most of the resources that support research are coming from sources outside of the state government. If you think about California or Arizona, for example, the consequences of losing that support by not having the state provide the resources necessary to attract and retain great faculty members is quite monumental and has a cascading set of effects, not only for the universities but for the state.

Speaker: Another question about tradeoffs: Suppose you had to choose between having two great public universities and four very good ones. What would you think about that?

Mr. Cole: That's an interesting question. It's a choice I would not like to have to make but it may be a choice that we have to face. I think that I would opt for the two great ones because it's extraordinarily important to have what comes out of these great universities.

Very good universities will produce very good things but generally not really extraordinary things. But we would have to be more explicit about what we mean by great and what would flow from greatness, as opposed to what would flow from being very good.

There are about 125 universities at the very apex of the hierarchy within our education system. Below that, there are some very good institutions in certain fields, but they don't overall rank that high. I think that maintaining true greatness is extraordinarily important because I think that's it's extremely hard to recreate. Again, I hope we don't have to face that choice.

↘ **JONATHAN COLE** is the John Mitchell Mason University Professor at Columbia University, where he served as provost and dean of faculties from 1989 to 2003 and Vice President for Arts and Sciences from 1987 to 1989. He is a member of the American Academy of Arts and Sciences, the American Association for the Advancement of Science, the American Philosophical Society, and the Council on Foreign Relations. His most recent books include *The Great American University: Its Rise to Preeminence, Its Indispensible National Role, Why It Must Be Protected* (Public Affairs, 2010), and *The Research University in a Time of Discontent* (Johns Hopkins University Press, 1994), which he edited with Elinor Barber and Stephen Graubard. Cole can be reached at jrc5@columbia.edu.