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**The University-Government Research Partnership:**  
**An Alliance for Science and Technology Leadership**  
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Thank you, Bill, and thank you all for being here. I welcome the opportunity to participate in this AAAS forum on science policy. The ties that bind American science, our research universities and the federal government are critical, and I look forward to sharing some insights with you.

Among Bill's many impressive credentials is the fact he is the former director of the Massachusetts Institute of Technology's Washington office, and now teaches at MIT and is heavily engaged in its major technology policy initiatives.

MIT is a member of the Association of American Universities, and a day rarely passes without it being in the news.

Two weeks ago, MIT made headlines when the QS World University Rankings named it the best university in the world. I should say, when QS World University Rankings named it the best university in the world again.

MIT frequently sits atop the QS world rankings, along with a number of American universities.

This does not happen by accident.

I'd like to begin this morning with a short video that provides an overview of how this global dominance by American universities came to be.

As president of the Association of American Universities, I am privileged to represent 62 of the finest public and private research universities in the United States and Canada.

I believe deeply in the power of AAU universities to make a difference, as evidenced by their presence in any and all serious rankings of the world's leading universities. From Harvard and Johns Hopkins to Texas and UC-Berkeley, these research universities foster innovation, attract and advance talent, underpin economic and national security, and improve the quality of our lives.

Universities do this work with the support of American taxpayers and a social compact that has been in place for decades. That is why we at the AAU are working hard to make the case to Congress for stable and sustained growth in funding for research, while pushing back against proposed cuts that threaten such funding.

One of every three Nobel Prize winners comes from an AAU institution. Seven of every 10 National Medal of Science recipients are at AAU institutions.

We represent the nation's best universities. And while AAU institutions benefit the most from the university-government research partnership, hundreds of universities across the country receive critical federal support for research at all levels.

I want to spend time this morning exploring the history of the federal-university partnership and reflect on its astounding 70-year track record of success. It's an essential prelude to discussing the situation in which we find ourselves.

And I want to leave plenty of time for your questions.

Let's go back in time.

We sometimes forget too easily the situation faced by the nation during the 1930s, when private universities – with Stanford as the poster child – were imminently threatened by catastrophic investment performance thanks to the Great Depression.

A “New Deal” from President Roosevelt in the 1935 Revenue Act had raised gift and inheritance taxes, thus potentially threatening private donations and bequests.

And the rise of public universities offered an inexpensive education compared to private schools.

During that period, federal funds administered through the Works Progress Administration also provided support to a small number of researchers at state universities, as well as for some building construction.

This support for the public grew when Congress passed the Bankhead-Jones Act in 1935, which doubled federal money to tax-supported institutions for agricultural research.

In contrast, private universities relied on research funding from corporations, private foundations and individuals during this period.

Paradoxically, throughout the latter part of the '30s, pessimism grew within the private university community.

There were hints that the federal government might provide financial support to private universities – thus effectively “forcing them into the arms of the government.” The fear was that the government would start exerting control over private universities as well as public ones.

The fear was not unfounded.

In 1933, the Federal Emergency Relief Administration approved the use of its funds to assist needy students at both public and private institutions. Students were hurting because their families' finances had been ruined. Among those to receive this federal support was a young man in New York named Arthur Miller, who went on to become one of America's greatest playwrights.

More than 130 private colleges and universities, including Harvard, Yale and other wealthy institutions, rejected this aid to remain completely free of all potential political influence.

Interestingly, Stanford, which was in very dire economic straits, gave in and with federal funds supported 300 needy students. By 1934, 12 percent of Stanford's student body was on federally financed work relief.

With this inroad to higher education and desperate need in the nation for research to solve the nation's challenges, Congress began in the late 1930s to legislate increases in research funding for universities.

In 1937, the National Cancer Institute was created as a branch of NIH. Prior to this time, all NIH research was in-house. That seems unfathomable today, doesn't it?

With the NCI, research grants could be awarded to academic scientists, and a revolution was under way.

There was a vigorous argument that ensued in the next few years about whether the federal government should be in the research business at all. In fact, the AAU dedicated an entire meeting in November of 1937 just to this topic, with most private institutions lining up to oppose federal support.

From the perspective of the private universities, their institutions were the only true havens where scholars and scientists could be insulated from the pressures of democratic society. I can only imagine the reaction this evoked from public presidents!

The debate only intensified in the next few years.

But then the war intervened. And everything changed.

Fortunately for us, Vannevar Bush was president of the Carnegie Institute of Washington and became a close ally of President Roosevelt. Bush understood that scientific resources in U.S. universities could be mobilized to help win the war.

And win it they did, with the development of vaccines and blood substitutes to keep troops healthy, and of technologies like radar, aeronautical innovations and the atomic bomb.

During this period, universities became very accustomed to dealing with a new patron: the federal government.

One of the critically important decisions made during the lead up to the war was that the National Defense Research Council would not centralize war research in laboratories under governmental control, but instead would place contracts for research with individual scientists and their universities.

The practice held great appeal for university presidents because the faculty would stay in place, but also because the Council reimbursed universities for both direct costs of research and indirect costs for facilities and administration. In fact, the idea was to make these reimbursements very generous to lure universities to undertake research on behalf of the federal government.

During the war there were many debates about indirect costs. But by its conclusion, the established policies and practices regarding the relationship between the federal government and universities were solidified.

Over time, federal patronage joined industrial support so that universities were now regarded as a provider of research both to the federal government and to businesses.

In return, the government and industry supported university research through grants.

The results of this 70-year partnership, especially growth in Defense Department research spending, the expansion of NIH, and the establishment of the National Science Foundation and NASA, have been nothing short of astounding.

America's research universities, and by extension our higher education system, are the best in the world.

People in Europe and Asia and everywhere know it's the best and are willing to pay for it, because they know they can't get anything like it anywhere else.

Why do our scientists win more Nobel Prizes?

Because as a nation we've invested in research.

Why have nearly all corporations shed their basic research and rely on the universities?

Because they know high-quality basic research can be done more cheaply on campuses than can be done in the corporation.

At the same time, the results of publicly funded research should rightfully be open and public – not private.

Make no mistake, this partnership created the internet, put a man on the moon, ended polio and countless other diseases, blunted the scourge of AIDS, and put the world in the palm of our hands with the smartphone.

Or to paraphrase a former CEO of Twitter, put the internet in our pants or purse.

By supporting basic research conducted at universities, the U.S. government has not only been able to foster amazing advances which have greatly improved our health, economy and quality of life.

We have also trained the next generation of scientists and engineers. Where else in the world could you come and work alongside Nobel Prize-winning researchers as a student whose education was being supported by a federal research award?

There is no other partnership like this on the planet.

And we are at risk of undermining it with shortsighted thinking.

There was a moment during World War II when President Roosevelt called Vannevar Bush into the Oval Office. It was 1944 and becoming increasingly clear that the Allies would achieve victory in Europe.

“What’s going to happen to science after the war?” FDR asked Bush.

“It’s going to fall flat on its face,” Bush said.

“Well,” said Roosevelt, “what are we going to do about it?”

Bush was characteristically blunt: “We better do something damn quick.”

Some 75 years later, that message is just as urgent.

As a nation, we had better do something, and do it quickly, about a monumental partnership that is threatened. Threatened by slash-and-burn budget proposals and a discounting of science that I firmly believe are nothing less than adismantling of seven decades of resounding success.

Its overall impact amounts to a surrender of our global dominance in innovation.

This comes as China has increased its R&D investments by 17 percent and Russia has increased its by 8 percent, while the U.S. investment has deteriorated to a mere 2 percent of GDP.

Other countries are modeling our success, and unless the U.S. government renews the partnership with research universities, it is simply a matter of time before we will no longer lead.

I see two major threats to this historic partnership.

One is the targeting of indirect costs as a way to balance the budgets of agencies that support university research.

And the second is the federal deficit.

Indirect costs are the facility and administrative expenses that universities incur while conducting work funded by the NIH, NSF, NASA and other agencies.

I am often asked the following questions about these costs, so thought it might be helpful to review some of these with you.

First, why does the government negotiate a standard rate with each university?

Because unlike industry, a university has thousands of grants. It is far more efficient to estimate the reimbursement across the university based on average building costs, personnel infrastructure, animal and human subjects regulations, et cetera, than it would be to negotiate these on each individual grant or contract with a federal agency.

But don’t think that these same indirect costs are not included in every contract that industry receives from the government, often at rates which are much higher than university rates.

Second, why do the costs vary across different universities?

Because where you are located, and whether you are public or private, affects your actual costs.

This could be due to energy, personnel, or real estate costs that vary from state to state.

Next, why designate some university expenditures as “indirect” costs?

Because the federal government strictly limits what can be requested as direct research funds. As an example, it is not permissible to charge heat, light, waste disposal, animal care infrastructure, regulatory compliance costs, et cetera, as direct costs. This despite the fact the university must spend money on these essential costs to carry out the research.

As a former university president, I always considered the risk profile of the university-federal relationship this way:

First, the university risk is considerable.

Universities recruit faculty and are responsible for providing start-up costs and research spaces in buildings that must be equipped and maintained for modern, complex research. They nurture faculty so that they may compete for research grants with a massive research infrastructure that is not always visible to the casual observer.

Second, government agency risk is, well, virtually nil.

What the federal agency does is advertise that it seeks research proposals for the given areas of investigation. It then uses peer panels to select the best and award grants to scientists.

Given the differential in risk, I was always grateful that the agencies would reimburse our university expenses, which were already incurred, and help maintain their share of the considerable costs of facilities and administration.

In fact, I was concerned, but could always manage, when it became clear that at Michigan, we were also contributing about 25 percent of the total indirect costs of our research enterprise.

At some point, however, increasing the cost sharing is not feasible.

That was why it was so troubling when the Trump administration seized on indirect costs as a significant way to cut the NIH budget and others in last year’s proposed budget.

We were able to beat back this proposal, for now.

I do not want us to let down our guard.

This would be a catastrophic blow to research universities and a terrible precedent for what amounts to balancing the federal budget on the backs of students and their families.

Because for most universities, the only ready source of additional revenue is tuition from students. And I have never felt it was fair to charge students for research solicited by and conducted for federal research agencies. I believe students and parents would agree with me.

These kinds of proposals stunt our ability to make higher education accessible and affordable, sidelining millions of future American innovators and creators.

Without the federal government's reimbursement of indirect costs, universities will be forced to scale back research that may help develop the next vaccine or cure, or the next technological innovation that will create new businesses or help secure our country.

Groundbreaking science at universities simply cannot happen if they could not recover the costs of electricity, laboratory space, and other indirect costs necessary to do research.

Universities share a commitment to transparency, to careful stewardship of taxpayer dollars, and to conducting quality research and training. They are committed to this.

While the current system of indirect costs is complex, it is absolutely integral to the successful university-government partnership.

We must protect it.

My second cause of concern is the growing federal deficit.

It is looming, and it is looming large.

The Congressional Budget Office projects the deficit will top \$1 trillion in 2020. That is 18 months away.

This growing deficit likely means higher interest rates and lower stock prices, and it will certainly mean a greater share of federal interest payments on the debt.

It threatens the overall pace of the economy and the vibrancy of the private sector. At some point there's going to be a day of reckoning, unless we have extraordinary economic growth.

That growth will need to be at least 3 percent to overcome the current deficit. And while growth is picking up, we have not yet reached that goal.

So as we contemplate how the U.S. can maintain its global leadership, we should also be realistic about difficult choices our political leaders must confront in the not-too-distant future.

We believe that a vital part of fostering economic growth and jobs is federal investment in scientific research at our universities, which leads to new knowledge, continuous innovation, reliable national security and more.

I'm pleased to say that after a lot of negotiation and conversation, the budget for FY 2018 provided significant increases in a number of areas, and all Americans should be thankful Congress took an important step in the right direction.

At the AAU, we are urging members of Congress to continue the momentum.

We were alarmed at the initial news of the Administration's proposals for FY 19 – cuts that would chip away at the foundation of the government-university partnership. But we are pleased

that the House and Senate continue to support federal research, as seen in most of their initial spending bills for FY19.

Let me give you a quick snapshot of what the AAU is hoping for with budgets of the leading funders of science and technology research at universities:

At the NIH, we are calling on Congress to allocate at least \$39.3 billion for FY19, or slightly more than \$4 billion than what the Administration proposed and \$2 billion more than the current year.

The NIH budget is the underpinning of biomedical research in this country.

Research dollars go toward treatments and cures for cancer, Alzheimer's, diabetes, autism and more. In addition, NIH research funding supports hundreds of thousands of jobs.

At the National Science Foundation, we are urging a budget of \$8.45 billion.

After years of level funding, the House and Senate Appropriations Committees recently passed bills that would increase the NSF's fiscal year 2019 budget by 5 percent.

While this increase is a welcome and much-needed step forward, additional funding is required for the agency if the U.S. is to remain at the forefront of science, technology, and innovation.

Therefore, the university and science communities are continuing to advocate for an \$8.45 billion appropriation for NSF.

NSF support sustains an array of research, from the biological sciences and computer engineering to geosciences and behavioral and cognitive sciences.

It also is a strong supporter of STEM initiatives, which are critical to our future competitiveness as a nation.

At the Department of Energy, where the administration is proposing a reduced budget, we are calling for \$6.6 billion.

DOE funding is the catalyst of basic physical science research in the country.

The Trump administration is calling for the elimination of a program known as ARPA-E, which supports high-risk, high-reward research that private industry won't touch. We believe that eliminating ARPA-E would be a big mistake.

And at NASA, we are encouraging a budget of \$6.5 billion for the Science Mission Directorate, which funds important missions in earth science, planetary science, astrophysics and heliophysics.

For the last two years, the National Space Grant Fellowship Program has received an appropriation of \$40 million. So, we were pleasantly surprised when the Senate Appropriations Committee recently recommended that the program receive \$44 million for fiscal year 2019.



It is a program that provides students from all 50 states and the territories with the opportunity to participate in NASA-supported aeronautics and space projects.

This is the time for our entire community to speak with one voice about maintaining our preeminence for the benefit of American science and the American people.

University research supported by American taxpayers leads to jobs, patents, inventions, new products and therapies, and a higher quality of life.

As our nation faces increasing global competition, we should be growing – not gutting – our investments in research, student aid, and higher education programs.

Our economy, health, and national security all depend on the ability to educate the scientists, engineers, researchers, and innovators of the future – talented individuals who will, in turn, create the medicines and technologies that will drive our economy and wellbeing.

Here let me add a final footnote of concern about our nation's ability to maintain a global leadership role in science.

One of the hallmarks of American science is that we welcome the best and brightest students, not only from the United States but from around the world, to study and work in this country.

And many of these foreign students and scholars, after coming and seeing what our country has to offer, end up staying and significantly contributing to American science and the U.S. economy.

Indeed, we have greatly benefited from foreign talent.

Since 2000 alone, almost 40 percent of U.S. Nobel Prize winners in chemistry, medicine and physics were immigrants.

Yet our ability to continue to attract top talent is being threatened by a mounting perception abroad that we are no longer welcoming of foreign visitors.

From the travel ban on individuals from Muslim nations, to growing fears about security risks posed by foreign students and scholars – particularly those from China – I fear we are risking the long-held views of U.S. universities as destinations for foreign talent upon which the country has greatly capitalized and benefited.

As universities we must be cognizant of and work closely with government defense and security agencies to address legitimate economic and security risks. We cannot be naive to think that such threats don't exist, even on our university campuses. Clearly they do.

At that same time, in defending and trying to protect against such threats, we must not stifle the very openness and free flow of people and ideas which has, in fact, made American science and our research universities great.

I would like you to leave today carrying one message: We absolutely must fight to keep the university-government partnership strong.

This means continuing to robustly invest in research, as well as student aid, at the federal level.

It also means continuing to welcome foreign talent while at the same time taking steps to do better growing our own domestic talent base.

If we don't, we will lose the global leadership and the preeminence that we enjoy.

The list of top 50 universities in the world ranked based on entrepreneurial and innovative activity contains 35 U.S. public and private research universities. There is no nation that comes even close to this dominance.

Are we willing to give that up? That is what is at risk.

I hope you will join America's research universities in encouraging Congress to maintain its longstanding and unwavering commitment to our nation's research enterprise and the partnership that has made our nation the global innovation leader.

The government-university partnership is a legacy unlike any other, and one that rewards all Americans with a healthy, prosperous and secure future.

Thank you.