

Address to the Boise Technology Show 2017

President Chuck Staben

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INTRODUCTION

Thank you inviting me to speak this afternoon. It's a pleasure to join you here.

I want to talk to you today about the role of higher education in the state of Idaho in meeting the opportunities and challenges for our state's present and future.

Specifically, I appreciate the chance to look at the role of the University of Idaho, as the state's major research university and its land-grant institution, with a mission to conduct research for the benefit of the state and to provide access to a high quality education for Idaho citizens.

Great public research universities have helped build our country, and they have a key role in the future health and prosperity of this state.

IDAHO IMPERATIVES

Idaho is a state with many blessings. I have come to appreciate that fact in the more than three years now that my wife, Mary Beth, and I have called Idaho our home. We have wide open spaces, beautiful mountains and rivers, as well as many of the advantages of urban life.

I realize that I am speaking to the choir here when it comes to the great quality of life in this state.

But Idaho also has need to grow in smart and sustainable ways. We can enhance the educational attainment of our state, provide opportunities for students who want great jobs and good lives, and at the same time grow our economy.

That process, cultivating a workforce for the good jobs that can unleash the talent and ambition of our citizens right here in Idaho, is a virtuous cycle of educational attainment and employment.

At the same time, research and development that unleash innovation and discovery are critical to enhancing prosperity. Idaho's research capacity is unique in some regards, as I'll explain.

We also need to focus on encouraging entrepreneurship. Idaho is a great place to start a business. We can unleash that potential by equipping our citizens with the tools and training they need to succeed as entrepreneurs.

In each of these imperatives, Idaho's higher education system, especially its research universities, have a central role.

IDAHO'S ECONOMY

Some context about our economy: Idaho's economy bears many similarities to that of the United States as a whole, as you can see, with a diverse base of industries. The greater impact from our agricultural sector is perhaps the most prominent difference, shown here on the far left of the image.

By the way, that agriculture sector is now dominated by dairy and livestock – which is why you see UI moving forward with our CAFÉ project. CAFE, for those of you who don't know, stand for the Center for Agriculture, Food and the Environment. This proposed new research center, which will be located in the Twin Falls area, received the support of the governor and the legislature, with a \$10 million investment from the state that will be the University of Idaho's investment in partnership with private support.

As Idaho's land-grant institution with an agriculture research mission, we have supported Idaho crop agriculture for many years and we will continue to do so, but we must step up to the economic reality that the greatest value comes from animal agriculture.

Considerable additional value also comes from related food processing industries. The CAFE project is an opportunity to conduct research that industry can use to optimize their efficiency and productivity.

This chart is something of a snapshot. What is clear is that Idaho is changing, becoming an increasingly urban state and more demographically diverse. Agriculture continues to be a strong driver in our economy, but it is increasingly innovative and automated.

A technology sector is gaining prominence, something you here are very involved in, not just in Boise and around the Idaho National Laboratory but in places like the Coeur d'Alene-to-Spokane corridor. Within other established and growing sectors like healthcare, there is continued strong growth correlated and aided by advances in technology.

Research universities, with their educational and research missions, are a significant part of how we position ourselves to build on our core strengths in sectors such as agriculture while diversifying to provide maximum opportunity for employment and innovation.

TECHNOLOGY GENERATES NEW WEALTH

Recently Forbes released its list of the world's billionaires. The list is revealing about the increased prominence of technology in generating wealth.

For instance, Bill Gates, even giving away much of his wealth to philanthropy, remains the world's richest man on the gains made by Microsoft. Amazon's Jeff Bezos is No. 3 in the world; his Chinese counterpart, Jack Ma, astride the China-dominant Alibaba online shopping industry, is No. 23.

A couple more examples from the top 25; you can see their logos here:

- Mark Zuckerberg – Facebook – No. 5
- Larry Ellison – Oracle – No. 7
- Larry Page – Google – No. 12
- Sergey Brin – Google – No. 13
- Steven Ballmer – Microsoft – No. 21

10 years ago this list would have looked much different. Many of us were just hearing for the first time about this thing called “Facebook” ... and we were starting to use “Google” as a verb.

Along with generating great wealth for the founders, the technologies you’ll find represented here have changed the way we live and work. They’ve opened up opportunities for untold thousands of Americans, either at those companies but even more at the companies and industries that benefit from that game-changing technology.

The companies have a connection to higher education, both getting a kick-start in that field – Steve Jobs may have been a college dropout, but Larry Page and Sergey Brin started Google from a Stanford PHD program. And Mark Zuckerberg famously changed the way we “like” things from his dorm room in Harvard.

THE VALUE OF HIGHER EDUCATION

This graph show the correlation between bachelor’s degree attainment of adults and per capita income.

Note that Idaho is 49th in per capita income and in the bottom ten for attainment.

Almost 50 percent of the variation in per capita income correlates with attainment.

We know that on an individual basis, a person with a bachelor’s degree will earn \$1 million more over a lifetime than an individual with only a high school degree.

Idaho can and should be farther up the trend line with the “good jobs” that offer high pay and financial stability.

A host of other benefits attend postsecondary completion – health and well-being, increased civic participation, enhanced contributions to the community.

As I tell students, a good job is the foundation for a great life. And more and more, the road to those good jobs goes through higher education.

So we all agree how important it is for the United States, for Idaho, and for each student that they earn a college degree.

IDAHO EDUCATIONAL ATTAINMENT

The Idaho Department of Labor recently looked at the composition of Idaho’s workforce through 2024 in terms of projected educational attainment.

As you can see, Idaho is likely to have about 38 percent of its workforce with an Associate’s Degree or more, plus another 6 percent with a postsecondary certificate.

How do we move towards the states’s 60 percent goal? We are doing a good deal, but there is no silver bullet. We need a multi-faceted approach that connects higher education to the K-12 system, and which

engage those Idahoans who are out of school and limited by their educational level. Programs like the Governor's Adult Completer Scholarship

We must engage students coming from high school. We must re-engage Idahoans whose prospects are limited by their education-many of whom are now place-bound. We need programs like the Governor's Adult Completer Scholarship. We need effective, accessible distance education.

IDAHO'S GO-ON CHALLENGE

Most recently Idaho's go-on rate has been estimated at about 46 percent.

In order to compare against other states, I want to step back to the most recent available data, and that's the chart you see before you, some selected instances of the recent 16-month progression to college by high school graduates.

As you can see, Idaho is one of the lowest. Which is the highest?

IDAHO'S GO-ON CHALLENGE (CONT.)

Perhaps surprisingly, the answer is Mississippi, with a 79 percent go-on rate.

We have an enormous, untapped talent pool in our state, with only 46 percent of high school seniors going on to college within 16 months after college. Even understanding that a certain percentage go on to military service or religious missions does not significantly alter the very low college-going rate.

The University of Idaho has aggressively tried to change that college-going culture. We've helped lead the Direct Admissions program, which offers automatic admission for qualified high school seniors to a public institution in our state. In our second year. Getting to college is a somewhat complicated process, especially if you're a first-generation college student who may not have family members or others nearby to navigate that process. This is one concrete effort to lower a hurdle on the way to college.

And it's working. In fall 2016, the state of Idaho realized a 5 percent system-wide increase in the number of first-time freshmen attending college. That was a 6.5 percent increase at the University of Idaho.

A study by our James A. and Louise McClure Center for Public Policy Research in collaboration with the Treasure Valley Education Partnership showed that the program made a difference for 30 percent of high school seniors in their decision to attend college. If you can convince 30 percent of high school students to do anything, you're doing something right.

I want to keep building on that success, and complement it with focused outreach efforts to cultivate a student population in higher education that is specifically interested in STEM fields.

IDAHO STEM NEEDS

What I tell students is that a college education, for most people, is the best possible path for a good job and a strong financial future. STEM jobs are good jobs – engaging work that provides the financial

stability for employees to raise families, buy homes, contribute to their communities, and all those positive things.

According to the Idaho Department of Labor, STEM jobs saw little growth in Idaho in the last 10 years; but they are predicted to see major growth in the next 10! That growth rate will be much higher than the United States average.

Idaho universities, community colleges, career and technical education providers are striving to recruit students and meet demand.

STEM DEGREE PRODUCTION IN IDAHO

The primary producers of Idaho's four-year and advanced STEM degrees are the state's three public research university. Idaho State University and Boise State University are both R3 "moderate research activity" according to the Carnegie Classification, and the University of Idaho is the state's R2 "Higher Research Activity" institution. Those classifications reflect the breadth and depth of research activity, as well the granting of doctoral degrees.

As you can see, over the most recent six years for which we have data, the production of STEM degrees has overall increased. A minor ebb in 2014-2015 might reflect smaller entering classes corresponding to the post-recession economic improvement. You can see that Boise State University continues to make strides in the production of STEM degrees, and that the University of Idaho has something of a leadership position that is relatively stable over time.

Again, we have a vast pool of college-qualified students who are not yet in the degree pipeline at all. Over time we can expect this STEM degree production to grow. The University of Idaho is certainly interested in leading that growth.

I think it's important to discuss not just the degree that students receive, but the experience that they have in order to attain that degree. The degree is an important signifier, but the quality and caliber of the educational experience is what allows a student to graduate with the preparation needed to contribute right away to organizations and industries.

That hands-on learning is essential to our work in preparing students for life and careers. Early in my presidency I recognize the opportunity we had to do more as Idaho's higher education research leader. As the state's only Carnegie R2 "Higher Research Activity" university, and our annual expenditures actually surpassed \$102 million dollars last year, twice the expenditures of all other Idaho institutions combined. I mention that because it gives you a sense of the scope of UI research and scholarship, and the sheer amount of student involvement in that work. We are a university that takes pride in the fact that most undergraduates – about two-thirds, currently – participate in a work of research, scholarship or creative activity during their time at UI.

That scale also presents an organizational challenge to ensure that every student who wants one has a meaningful opportunity. That's why during my presidency we've created a new Office for Undergraduate Research at the University of Idaho. The office reaches out to students to coordinate their involvement in research and scholarship, connecting them with faculty, organizing symposia, and actually offering a competitive grants program for students interested in funding their research and traveling to present their work.

We actually had our students work together to create a new magazine called “Vandals in Focus” that highlights a lot of this work from the past year with stories and photography. You can find that on our website.

Recently the University of Idaho completed a Strategic Plan through 2025. As we meet the performance measures in that plan, we will increase the number of undergraduate and graduate students paid from sponsored projects. We also want to increase the percentage of students involved in undergraduate research and scholarship from 66 percent, our current baseline, to 75 percent.

While we bolster our research opportunities, we’re also working to continue to emphasize the outstanding educational experiences that lead directly to good jobs. I’ll give you a couple examples that originate in our College of Engineering. As many of you may know, our University of Idaho has signed on to the National Academy of Engineering’s Grand Challenges Scholars Program. We’re one of 120 institutions nationwide involved in the effort, including many of our peers among national research universities. The program has identified 14 key areas and staked out a goal of preparing 20,000 new graduates to take on those pressing national concerns.

One area where the University of Idaho College of Engineering is going to play a strong role is in computer science. We actually received the go-ahead from our state board and support from the governor and the legislature to implement a four-year computer science degree in Coeur d’Alene, in partnership with North Idaho College. Students complete their first two years at NIC and transfer seamlessly to UI-Coeur d’Alene.

We have upward of 80 students already in this pipeline and invested in faculty last year to begin the program. An exciting component of the computer science curriculum is the cooperative education track, developed in partnership with the STEM Action Center. The track emphasizes internships with local industry. Students will divide their program between focused internships with specific educational goals that reinforce coursework and with semesters in the classroom. That means students will graduate with industry applicable skills, on-the-job experience, and a built-in network of employer connections. Cooperative education offers a win-win for students and industry – experience for students on their way to a great job, and support and resources for industries as they innovate and expand.

We also just celebrated our 24th consecutive Engineering Design EXPO. This is actually the longest-running student-project engineering exhibition in the Northwest. We brought **Brent Stacey, cybersecurity consultant with the Idaho National Laboratory**, to Moscow to speak to our students. His keynote speech described some of the cybersecurity challenges our critical infrastructure faces.

More than 275 University of Idaho engineering students participated with 40 technical presentations and 60 booth presentations. Graduating seniors show off their capstone projects in this hands-on degree program. Judges drawn from the ranks of important regional employers offer constructive criticism and feedback, and students also see the firsthand connection to rewarding careers in addition to insight about their projects.

Students are taking on innovative and thought-provoking work in everything from 3D metal printing to downtown Boise infrastructure to high-altitude balloon launches to flywheel energy storage. It’s interesting work. Our students are heading to careers at organizations like Micron and Hewlett Packard

in Boise, and Schweitzer Engineering Laboratories, Garmin, Intel, Boeing and Apple nationally – and I would like your help keeping more of them right here.

IDAHO INNOVATION: A PUZZLE

Earlier I mentioned Idaho's unique research and development profile. Understanding that profile can point the way to opportunities for growth and enhancement of existing strengths.

Idaho is, overall, about where one might expect in terms of overall research expenditure, but our profile is very uneven.

For example, the five agencies in the table – the Department of Defense, the National Institutes of Health, NASA, the Department of Energy, and the National Science Foundation, sponsor 94 percent of all Federal research.

You can see that we are very high in Department of Energy funding, about where one might expect in terms of Defense Department research, and VERY low in other areas.

Paradoxically, Idaho is in the Top 10 states for research and development as a percent of Gross State Product: 3.6 percent. For comparison, the United States average is 2.7. China's percentage is 2.1 percent and growing.

We achieve that distinction by virtue of a comparatively low Gross State Product combined with the presence of the Idaho National Laboratory.

Across the United States, 71 percent of research and development is performed by business, 14 percent by universities, and 11 percent by federal labs. So Idaho is very different from the rest of the country as a whole.

Why does that matter? Idaho has an incredibly valuable asset in the form of the **Idaho National Laboratory**. And I am glad we are building around it with new initiatives like Cybercore and Collaborative Computing Center – but I encourage you to think about how you and UI can collaborate farther with INL.

Our computer science and computer engineering students benefit from having a direct connection to a national laboratory where those challenges are being met.

Our university's presence in southeastern Idaho has in many ways grown up around the Idaho National Laboratory. We partner with the laboratory on research and are an educational partner in nuclear engineering and materials sciences for employees.

We might also consider the glass half-full in respect to other agencies: We have room to grow in terms of funding from non-energy and non-defense sources. To even get to national averages would mean significant increases in important areas.

Those impacts would benefit industries across our economy, spurring innovation and discovery that leads to growth and sustainability. Higher education can be a facilitator of that growth, building

relationships in key areas and projects, with the effect of seeding economic development and perhaps building a workforce.

IDAHO'S RESEARCH UNIVERSITIES

I want to fill out the picture of university research and development, as well as workforce training. This chart offers a look at the work of our state's research universities and the production of doctorates in science and engineering, key indicators from the NSF.

Though UI is the largest in terms of research expenditure and STEM doctorate production, we have a long way to go. In our Strategic Plan, we are focusing on increasing the number of terminal degrees awarded – most often a doctoral degree – by nearly 50 percent for a total of more than 400 terminal degrees awarded per year. That will be a significant increase in research capacity available to academia, to our federal partners such as the INL, and to businesses across Idaho.

As many of you know, the governor has assembled a Higher Education Task Force. The approach is similar to the K-12 Task Force that has resulted in increased investment in our K-12 system. Research is not on the Higher Education Taskforce Agenda, unfortunately.

Worth pointing out, usually the largest extramural funder of research at universities is the National Institutes of Health through an academic medical center at a research university.

Without such an academic medical center, we lose the opportunity to capitalize on those opportunities for research funding. The University of Idaho does have a medical education partnership with the University of Washington School of Medicine – the Idaho WWAMI program. That program has doubled its capacity in the past few years and reshaped its curriculum to have students focusing their time here in Idaho. But that partnership includes only a small medical research component.

And when the Idaho College of Osteopathic Medicine opens, it's important to note that it is not likely to address research, with medical education its primary mission.

IDAHO ENTREPRENEURSHIP

I want to talk about entrepreneurship. It's an important part of what a research university is able to do. The Kauffman Foundation releases an interesting annual report called the Kauffman Index of Startup Activity. Their state-level reports offer a look at important indicators of the entrepreneurial climate. For instance the Rate of New Entrepreneurs in the economy is calculated as the percentage of adults becoming entrepreneurs in a given month. In Idaho, that Rate of New Entrepreneurs is about 320 out of every 100,000 people, or 3.2 percent. It is behind California, for example, but very close to the national average.

The Opportunity Share of New Entrepreneurs is the percentage of new entrepreneurs driven primarily by "opportunity" vs. "necessity." That is, what entrepreneurs were not unemployed when they started their new business, but simply seeing an opportunity in the market and having the capital and the climate with which to proceed. Idaho's opportunity share is again behind the large-state example of California but not so distant from the national average.

The Startup Density of a region is measured as the number of new employer businesses, normalized by the business population. In other words, the number of new businesses that employ people within the

entire employer landscape. As the Kauffman Index notes, “Although new businesses with employees represent only a small share of all new businesses, they represent an important group for job creation and economic growth.” Idaho again scores well in this metric.

In fact, among smaller states measured by the Kauffman Index, the state of Idaho is one of the higher ranked states for start-up activity.

Reflecting that positive landscape, Entrepreneur magazine recently named Idaho the fourth easiest state to start a business, based on a survey by Thumbtack.

How do universities contribute? First, we can train entrepreneurs. Our College of Business and Economics excels in the kind of pitch and business plan competitions that prepare students for succeeding in business.

We can also leverage our mission to do economic development. Here in Boise we have great relationships with groups such as the Boise Valley Economic Partnership and others that are focused on helping new businesses take off and established businesses enhance their success.

We recently hired a new Executive Director for Economic Development, Jana Jones, and I hope you will get to know her.

As a university we know we can contribute very directly to entrepreneurship here in Idaho.

THE FUTURE OF SCIENCE AND INDUSTRY

In closing, I want to point out that an interest in science, technology, engineering and math starts in childhood, and it must be nurtured. Some of the formative experiences from my childhood include trips to the Museum of Science and Industry in Chicago with my mom on Teacher Institute Days. You can see from the pictures here how awe-inspiring the museum would be for a boy, and how it would foster an appreciation for learning about how the world works.

As a child, as well, I had an aunt who was a librarian at our local library. I recall reading an inspiring book called “Men of Science and Industry” — a favorite book given to me by my aunt, a librarian. It opened up the world of famous men and their discoveries and innovations.

In 2017, that book is dated in more ways than just the science and industry described. If we’re writing that same book today, we’d better make sure we can title it “People of Science and Industry.” Our STEM fields have to be diversified. For instance, our College of Engineering, successful as it is in so many ways, is still only about 18 percent women. That’s about average for the nation, actually, but it shouldn’t be comfortable.

We’re working to recruit more representative classes across our STEM disciplines. Our K-12 system must engage. Our postsecondary institutions must engage as a system. We certainly need to partner more effectively on these issues with private industry.

In closing, I hope you are as excited as I am about the opportunity we have in this state. Challenges remain, but we are on the right track.

The University of Idaho is proud to use its research university strengths to build a STEM-centered Idaho that provides more opportunities for our state's citizens and that unlocks the innovation and economic development potential you all see firsthand every day.

Thank you.