

**SUN MICROSYSTEMS
WORLDWIDE EDUCATION AND RESEARCH CONFERENCE**

**President Robert C. Dynes
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[REMARKS AS PREPARED FOR DELIVERY]
[NOT AN OFFICIAL TRANSCRIPT]

I'm delighted and honored to be here. I consider Sun Microsystems to be a very valuable partner with the University of California, in many arenas. From contributing computers, to funding significant research projects, to consulting on systems issues, Sun is involved in the work of UC in a very important way.

I'm also pleased to be sharing the agenda today with Larry Smarr, who will give some very real-life examples later this morning of the value of partnerships and the interdisciplinary nature of science and technology today.

Around the world, nations are increasing their investments in their scientific and technological infrastructure because it is so obviously the key to economic security. My theme today is the importance of partnerships -- and the need for collaboration -- among academia, industry, and government to achieve this global economic growth.

At the University of California, we have a three-part mission. We describe it as research, education, and service. Now, let me say what this actually means, and how it applies to all of you. I describe it this way:

First, we *create new knowledge* – that's the research.

Second, we *create the next generation of creators*, through our teaching.

And third, we *take the creations out for public benefit* – and that is an important part of the service component in a public research university in the 21st century.

Creating, alone, is not what we're all about. The point is, as we create, we're also creating the next generation of creators, and we're doing something with our creations that makes a contribution to the world. I know these are not necessarily welcome words to those faculty who consider

themselves to be doing “pure science” or “basic research.” At the University of California, we don’t draw a division between “basic” and “applied” research.

To me, it’s really about R, D, *and D* – research, development, *and* delivery. We’re not just here to do what I call “curiosity-driven” research, as much as I value curiosity and believe it is integral to the process of discovery. We’re here, ultimately, to help solve problems.

Let me remind you of what the research environment was like in the United States 40 years ago. We had the big industrial labs doing much of the basic research -- GE, Bell Labs, RCA Labs, Exxon, Xerox, IBM, Kodak. These companies could afford to conduct this level of research in that day and age. As the rest of the world became more competitive in the years that followed, however, companies felt less and less comfortable investing shareholder money in long-term research. I realized this about the time I left Bell Labs to come to UC, because I saw that the locus of innovation was moving.

Given that movement, and given the current structure of our research enterprise, it is more critical than ever that industry, academia, and government work together effectively in the interest of fueling economic and social growth through scientific discovery. The question I’d like to address today is how we maximize the effectiveness of these partnerships.

Let me start with government. One of the most critical things government can provide is stable, long-term support of the research and education enterprise. This is a challenge -- the careers of most of our students are longer than legislative term limits! In the University of California context, let me address the role of government at two levels – state and federal.

At the state level, first, we have had very good success with Governor Schwarzenegger. The first time I met him, I didn’t quite know what to expect. But interestingly, the conversation got off onto the topic of fiber optics, and the governor was deeply interested in the research going on. He clearly *got it* – he understood the importance of university research to commercial development and economic growth.

The next thing we knew, even in the middle of California’s budget woes, we were agreeing to a “compact” with the governor that would provide basic, growing funding to the University over a multi-year period. This was just what we needed to achieve stability and to establish a base to plan from.

At the federal level, like many of you, I believe there always needs to be more funding for research, and there is some reason for concern on this

front in the president's new budget. Beyond basic funding levels, though, a significant problem we face is that faculty spend too much time trying to put bread on the plates of their graduate students. The average government grant is three years, but the careers of our students are five or six.

For those investigators who have a demonstrated track record of successful research, effective education of students, and accountable use of resources, I think we should be talking about lengthening the term of the average government grant. It would be an excellent investment in stabilizing the infrastructure of the research enterprise and the people within it.

Now, let me turn to the academy, and to what we need to be doing to maximize the effectiveness of research partnerships.

The first is to recognize that science is interdisciplinary. I no longer talk about physics and chemistry as distinct fields. I talk about science. Young people want to do physics on the environment, on energy, on biological systems. The future is the intersection of physics, chemistry, biology, neurosciences, psychology, mathematics, computer science. But we don't always organize ourselves that way.

The second thing we, in universities, need to be doing is doing more than teaching good science. While I was chancellor, I put together collection of CEOs in San Diego and asked them what they needed from UCSD. They said, "UC does great job in preparing students technologically, but we need them to be able to write and to speak, and we need them to be able to work in teams." So we focused attention on building those aspects of our programs. We created courses where every member of the team got the same grade. We need to be asking those questions – and paying attention to those kinds of issues – as we train the next generation of scientists.

Thirdly, we in universities shouldn't be trying to run the tech transfer office like a business. A business incentive should not drive the technology transfer enterprise, from the perspective of the university. The goal should be using our tech transfer office to expand our discoveries for the good of society – to find the very best ways of getting technology out into the marketplace where people can use it.

In California, I believe we have already taken many of these lessons to heart, and we have made great progress at making the modern, partnership-based research enterprise work well.

One of our major initiatives at the University of California over the last seven years has been increasing our enrollments of engineering and computer

science students by 50 percent to help meet industry workforce needs. We actually achieved that goal well ahead of schedule.

We have an Industry-University Cooperative Research Program that has engaged more than 350 companies in more than 600 research partnerships in core technology fields. These partnerships have involved more than 550 faculty and 1,300 UC students.

And, we have the California Institutes for Science and Innovation, which are a great example of public-private collaboration in cutting-edge fields of research. There are four of these institutes around the state, focusing on fields of research that are key to the future of the California economy – biomedicine, telecommunications, information technology, nanosystems, and the like. Our campuses serve as home base each of the institutes, but the private sector is deeply involved, kicking in 2 dollars for every 1 state dollar invested in these institutes.

What's important about them is that they are interdisciplinary, they are designed to speed technology out to the world, and they involve a flow of people between the public and private sectors and between the disciplines involved. That flow of people creates what I call "problem-rich environments." The people are focused on "what's coming next" problems.

I've touched on government and academia – now let me turn my attention to industry for a moment.

I believe one important thing industry should be doing is what Sun has been doing – investing back in universities. Industry can no longer afford to build, alone, the critical mass of research infrastructure that it needs. By investing in the work of research universities, industry can tap into an incredible wealth of intellect and innovation – and be part of the process of creating the next generation of creators and bringing their creations out to the world.

There is one last piece that I haven't touched on so far, and that is the need for a strong K-12 system providing the foundation for everything else I have discussed. That is a very serious challenge for us in California, due to very serious inequities in opportunity in K-12 schools.

Higher education has gotten involved in a number of ways. At UC, we have a variety of programs that work directly in the schools, helping improve the academic preparation of K-12 students and enhance their readiness for college. We also have technology-based initiatives that bring free Advanced Placement and SAT prep courses, online, to students who otherwise don't have access to them.

But it's clear that we need to get involved in a more fundamental way. We've got to help improve the teaching of math and science in K-12 schools across the state, in order to ensure California has the workforce of scientists and engineers it needs to compete in the global economy.

California today does not have enough highly trained, fully credentialed math and science teachers in its K-12 schools. So, we are about to launch an initiative, working with our partners in the other segments of higher education, to dramatically increase our output of math and science teachers – and to keep them teaching.

We'll have more details about this soon, and those of you in the private sector, we'll be coming to you for support because we need help from every corner to make this work, and doing this is in the interest of the entire state.

I hope I've shared with you today some useful points about the value and nature of effective research partnerships. Events like this one hopefully will renew, strengthen, and forge new partnerships, and I am pleased to be a part of your program.

With that, I'm happy to hear your questions and comments.