

Oral Testimony of UC President Robert C. Dynes
“Science and Technology Leadership in a 21st Century Global Economy”
House Committee on Science and Technology
Tuesday, March 13, 2007

Good morning Mr. Chairman, Ranking Member Hall, and other members of the Committee. Thank you for the opportunity to testify before you on the important issue of science and technology leadership for the 21st Century economy.

I want to specifically recognize Chairman Gordon and Norm Augustine for their leadership and support in seeking to enhance U.S. competitiveness through targeted investments in university research and in science and mathematics education, and for their particular focus on the excellent work of the National Science Foundation and on programs such as the one I will address today.

I am very pleased to have the opportunity to be a part of this panel, with my esteemed friends and colleagues, who are all leaders well positioned to address some of the problems that we are discussing.

My written testimony, which I have submitted for the record, outlines the University of California’s vision for ensuring strong competitiveness in California and the US. My vision rests on three planks:

- Fueling innovation and boosting the state’s economy by leading the nation in R, D, & D – research, development, and delivery of new products to end users,
- Forging strategic alliances with the best and brightest minds around the globe to solve problems that confront all societies, and
- Enhancing the quality of California’s future workforce by tackling the crisis in K-12 education.

This afternoon, I will provide a snapshot of a program at the University of California that speaks to the third plank. This new and exciting program, called the Science and Math Initiative is one of the models for the national program, “10,000 Teachers, 10 Million Minds,” which was outlined in the Academy’s report and in your legislation, H.R. 362.

Mr. Chairman, you have called upon us to recognize the challenges we face in research, and most especially in the education of our youth in mathematics and science. We share your interest in research universities harnessing their resources to increase the quantity and quality of K-12 teachers in math and science.

Your legislation will create an excellent model for research universities to implement this vision. We are stepping up to the plate to create a pipeline of math and science innovators for the nation's future.

The Science and Math Initiative, or SMI, is one of my highest priorities as President, and it has personal significance to me as a first-generation college student whose life was transformed by math and science.

The components are described in more detail in my written testimony, but essentially, the program aims to:

- Recruit UC students who are majoring or considering majoring in math and science fields to be teachers;
- Provide these students with innovative curricula that draw on expertise of faculty in science, math, and education; and
- Offer incentives to attract and retain these students as teachers, including a streamlined path to certification and financial incentives such as loan forgiveness and paid summer internships.

The University of California deans of science who direct the campus SMI efforts are energized about the program and are committed to its success. Our faculty in science and mathematics departments are collaborating with the faculty in our education departments on entirely new curricula for preparing science and math undergraduates...

Included with my testimony is an example from UC Berkeley of this new curriculum, which blends cutting-edge content knowledge in the sciences, including field and lab experiences, with distinctive new pedagogy specifically suited to conveying this knowledge to children.

We supplement the program recruitment with a "field experience" course, beginning at the freshman level and continuing in all four years, where students work in local schools under the supervision of mentor teachers and meet regularly in small seminars to discuss experiences and learn from one another.

Our early research on this field-experience course has demonstrated that it has a pronounced effect on student aspirations. Many intensify their commitment to teaching, and many find that their interest deepens in various aspects of their own science and math learning as they work with the students. Some of them also discover that teaching is not for them, which is important as well.

We recognize that many students transfer to UC from the California community colleges and CSU campuses and we are working with them to draw from this rich source of future teachers. This academic year, as many as 100 community college freshmen are participating in field experiences. This will allow them to pick up where they left off if they transfer to UC.

We are now in the second year of the program, and we are developing our model simultaneously on all nine of our general campuses. Collectively, our campuses provide an excellent laboratory for testing different approaches to meet our program goals. For example, some campuses have developed education minors with a math or science emphasis.

Common elements of the model include:

- Development of new, content-rich curricula combining cutting-edge math and science knowledge and specialized pedagogy;
- Student recruitment that provides for entry at all academic levels;
- Lower-division field experiences with "Master Teacher" supervision;
- Alignment of subject matter preparation with educational coursework to assure streamlined completion of an undergraduate degree, a preliminary teaching credential, and a master's degree in five years;
- Summer STEM institutes to develop distinctive pedagogy for teaching math, biology, physics, chemistry, and geosciences; and
- Financial incentives for student participation.

Behind me is a chart showing the progression of the SMI at UC Santa Barbara. This highlights the variety of ways in which students can earn certificates and the different paths they may follow in the SMI.

At all the campuses the students gain deep grounding in their math and science majors, early field experience, and an expeditious pathway to teacher certification.

To date, more than 600 students are enrolled in SMI on all our campuses, nearly 1,000 student placements have occurred in schools for field experiences, and we are involved with 467 teachers and 174 schools in 41 districts across California. We believe these are positive outcomes for all who are participating.

I am also happy to report that SMI has attracted enormous enthusiasm and support from both the public and private sectors. The vigorous support of Governor Schwarzenegger and the state

legislature has been instrumental in the program's strong start and to date, corporate and foundation funding is over \$4 million. We are especially grateful to our major sponsors, including the Intel Corporation, and I extend a personal thank you to Intel CEO, Craig Barrett.. (Thank you.)

I want to thank you for introducing H.R. 362, and lend my support to your effort. This bill would greatly assist programs like ours at UC, and we look forward to working with your staff on a few modifications that we believe are needed based on our early experience.

H.R. 362 would expand the SMI concept from California across the nation, and also focus more broadly on other elements essential to improving K-12 math and science education.

H.R. 362 is premised on students graduating with a science or math degree and teaching credential within four years. However, many of our best students take more than four years to complete a science or math degree. SMI streamlines the credentialing process, but because of varying teacher licensure requirements, especially in California, additional post-graduate training is needed.

We would like to see the legislation amended to allow flexibility in creating integrated programs that streamline the process to obtaining a bachelor's or master's degree and a teaching credential.

We look forward to working with you and your staff to enact this legislation. In addition, we need e Congress and the president to invest federal resources in this endeavor. UC can, and will, increase the number of science and math teachers who are trained, qualified, skilled, and equally important, passionate about science and math. However, this is an expensive undertaking and we need a sustained, long-term commitment from our current partners and the federal government, to realize our intended effects.

Finally, to give you one example of the value of this program, I share the words of one of our SMI students, who said, "After completing field work in the classroom, I knew teaching was for me. It made me realize the passion I had to help others and at the point I knew I wanted to make a career out of it."

Thank you and I would be happy to answer your questions.