

2006 College of Engineering Awards Banquet 60th Anniversary

Today, we come together to celebrate the 60th anniversary of our college. This occasion gives us a rare opportunity to reflect on the paths we have taken and on the new horizon awaiting us.

Our program was born during a momentous period in our modern history. That was 60 years ago in 1946. Two significant events took place during this period.

The first was the founding of the United Nations, which was conceived out of the aspiration for a better world, after the ravages of the two world wars in which tens of millions of lives perished.

The second was the invention of the semiconductor transistor, which was invented by three American physicists: Bardeen, Shockley, and Brattain. This invention started the information technology revolution, and it laid a strong foundation for America's global leadership in technology, of which Silicon Valley is the center.

Now, sixty years after, we are facing the possible loss of America's global technology leadership, because we no longer produce enough engineers, in comparison with other countries.

This looming crisis is beginning to register nationally.

President Bush, in his 2006 State of the Union address, outlined his responses in what is called the American Competitiveness Initiative. And leaders from both the Democratic and Republican parties are also taking action. Here I'd like to share with you something beyond newspaper reports.

On January 19th this year, I spoke in the Innovation Forum before the Democratic Caucus. This is part of the House Democrats' efforts in introducing bills to address issues in energy, education, broadband, research and development, and small business success.

Within about a month, on Feb. 20th, Senator Frist, a surgeon and the Senate Majority Leader, visited our San Jose State campus. It is Senator

Frist who introduced the Smart Grants offering \$4000 dollars each year to needy, high-achieving junior and senior students in science, technology, engineering, mathematics, and critical foreign languages.

The goal is to encourage students to study these areas, which are critical to America's competitiveness.

Moving from the national to the state level, specifically within the California State University system, which produces about half of the engineers in the state, President Kassing has hosted two conferences and led the efforts in developing strategies to address the looming national crisis.

Given what is going on at the national and state level, I have to report that here at San Jose State in Silicon Valley, we are seeing a peculiar picture, one that is hard to make sense of.

Specifically, our new student enrollment in information technology fields such as electrical and computer engineering has dropped significantly. The enrollment for mechanical and civil engineering has gone up. For the first time in the past 20 years, we had more mechanical engineering freshmen than electrical.

I asked a mechanical engineering freshman, let's call him Peter, why he chose mechanical instead of electrical engineering. Peter answered: "There are no jobs in electrical engineering. They are being off-shored."

To which I responded: "How about mechanical engineering?" He replied, "I don't care. I love to work on cars."

Well. This is good. Peter follows his passion. But how can I tell him not all the EE jobs have been off-shored? Or better yet, how do I inspire and motivate Peter to rise to the challenge of global competition?

I don't have the answer, but I'd like to suggest three areas for us to consider, areas that may be of great significance as the College of Engineering sails into the future:

First, we need to inspire our young people with compelling applications of technology, with innovation. Maybe we should tell Peter that the future of his cars lies-not in the engine but the fuel the engine uses.

Think for a moment: there may be many Peters out there to work on technological innovation. The fuel may no longer be gasoline, but the ethanol produced by some weeds, say switch grass. And we can have an abundance of these weeds right here at home, in South Dakota and North Dakota.

With advances in enzyme technology and bioengineering, the Dakotas may potentially rival OPEC. And we will have our own energy supply.

Furthermore, the use of this ethanol will reduce carbon-dioxide emissions into the atmosphere, which has increased seven-fold over the past sixty years. As we all know, this increase has contributed to the global warming that we are now experiencing.

Besides inspiring our students with innovation, we need to motivate our young people by educating them on the new reality of global competition. It is a flat world now, using Tom Friedman's term. In a flat world, knowledge work can be done in any part of the world, and knowledge workers such as engineers compete globally in terms of their costs and quality of work.

The best way for our students to experience a flat world is to send them to India and China to witness firsthand, in a visceral way, how competitive it is out there.

At the college, we have such a program, called GTI, Global Technology Initiative.

What is GTI? 25 top students, two-week study tour of Asia in the summer, all-expense-paid. In the past two years, our students visited China and Taiwan which they will also visit this summer. Now, we are now planning to visit India next year.

On this tour, our students visit universities and technology companies and factories such as HP, IBM, Cisco, Intel, TSMC, and National Semiconductor.

Well, I can tell you, our students have been thoroughly transformed by this trip.

Before the trip, our students commented that China has a per capita GDP of 5600 dollars, the same as Peru, a third-world country. What is this big deal about China? They realize they were wrong after visiting Shanghai.

Before the trip, they thought that China and Taiwan are America's factories. That is, they do only manufacturing, not R&D. They were proven wrong after visiting the Intel China Research Laboratory in Beijing.

Our students realize they have to change to be competitive. Their transformation can be summarized by the statement of Sarah Lemmer, an aviation student and a 2005 GTI fellow, "As a citizen of the United States, I have learned that we have the choice to either take charge or play victim, to change or resist. I choose change." Now, Sarah plans to study for a graduate degree.

So far I have talked about two ways to inspire engineering students; the first is about innovation and the second about global competitiveness.

Now, I would like to suggest the third area for us to consider.

It is an undeniable truth that people will find happiness in work that is meaningful to them. And the college has been working in this direction.

I am pleased to share with you that this summer our students will work on the Poverty Alleviation project with students of Tsinghua University, which is known as the MIT of China.

They will work together in the remote and poorer regions of China where, on average, each person has less than two dollars per day to live on.

There may not be running water or a reliable supply of electricity. In such an environment, students from both universities will set up e-Learning centers to help teach local children who otherwise don't have access to education.

The college students will be constantly challenged on what they have taken for granted and forced to be creative in using their limited resources.

In the end, our students will help poor and disadvantaged people in other parts of the world such as India, China, Mexico, and beyond. Here in the

U.S., they will gain a meaningful life experience that will deepen their understanding of global poverty. They will become not only better engineers, but also responsible global citizens.

In 60 years, we have witnessed America's ascendance as the global leader in technology and many other areas. In 60 years, we have also witnessed America's emerging reality of global competitiveness; a crisis, yes, but not a cause for despair.

In our learning community, we are blessed with the vision and hard work of parents, students, professors, staff, alumni and industry leaders.

We are in a unique historical moment to inspire the young, to guide generations of future engineers to innovate, and to become global leaders.

More importantly, each and every one of us, Peter and Sarah included, should be inspired to make it a personal mission as articulated in the United Nations Charter over 60 years ago, at a time when our engineering program was born, a mission that when we leave the world, the world is better than the one that found us.

With commitment to this mission, I am honored to be part of the College of Engineering's future, one that will strive to innovate, to become global leaders, and to make possible a better world for all global citizens.

I would like thank you for thinking through these important issues with me tonight.