

## We Will Lead the Way

*Within the College of Engineering, we have always relied on our creativity and pragmatism to maintain our competitive edge. These traits coupled with our ability to strategically choose what we want to be known for and then respond in short order to opportunities has placed us amongst the world's leading universities and engineering colleges.*



Our challenge in the College, not unlike the past, is to predict and position ourselves for future changes so that we maintain our competitive edge. As I write this, there is a general sense of paranoia around the country that we are not graduating enough engineers, and that the lack of engineering talent will result in the U.S. losing its technological dominance. It is true that the U.S. graduates about 73,000 engineers per year as compared to India and China, which graduate about 750,000 per year. It is also true that competitive pressures have forced U.S. companies to invest significant resources in manufacturing and R&D in countries such as India and China. This is motivated by the availability of lower-cost, trained workers and the need to reduce operating costs.

No amount of investment can change the winds of globalization – or reduce the cost of doing business in this country to the point where India and China become irrelevant. While it is in our interest to convince youth in this country to pursue careers in science and engineering, I do not believe that increasing the number of engineering graduates alone will sharpen our competitive edge. To compete with these countries – and maintain our standard of living – we have to follow a strategy called “comparative advantage.” Carnegie Mellon has successfully exploited this strategy to transform itself from a regional university to a national university in the span of a few decades, while maintaining its relatively small size. The U.S. is in a similar position.

### **How do we build our comparative advantage?**

We need to build our comparative advantage by rethinking our undergraduate engineering education, maintaining our research infrastructure and culture, and developing a strategy for globalization.

Historically, Carnegie Mellon has been at the forefront of education reform. The Carnegie Plan proposed by President Doherty in 1937 caused a paradigm shift in engineering education. This was followed by the Wipe the Slate Clean Plan in 1990 that proposed, among many ideas, the notion of teaching engineering to freshmen. This also had a major impact on engineering education in the U.S. We are now developing a curriculum within the College of Engineering, at both the graduate and undergraduate levels, that will create the engineers of the future by educating and training them to operate internationally. Our vision is that the engineer of the future must be able to enable, create, manage, and deploy innovation in a multinational environment. We plan to do this while maintaining our excellence in technical education. I call this the Carnegie Plan for a “Flat World.”

The U.S. can still boast that its research enterprise is the best in the world. Our policy of coupling R&D with education and technology transition has resulted in not just the creation of companies, but in dozens of multibillion-dollar industries. For example, Federal research investments have given rise to the semiconductor, software, computer, and biomedical industries, just to name a few. To maintain our comparative advantage, we must invest more in R&D and, therefore, in graduate education. While Federal investments will have a big role to play, the importance of graduate fellowships funded through the generous support of our alumni is extremely important. Such fellowships will allow us to recruit the best talent and compete effectively with other universities.

Every business entity has had to deal with globalization and alter its way of doing business or perish. The only U.S. institution that has failed to respond to global pressures is the university. *This* is the real threat to U.S. leadership in innovation. Our universities must embrace the world and operate beyond their campus borders so as to engage today's global enterprises and the world's brightest young minds. The College of Engineering has been a pioneer in this respect by pursuing an international strategy that has paid dividends in the short span of a few years.

Within the College of Engineering, we are developing and deploying a plan that will create the comparative advantage we seek as a university. I believe that the U.S. can effectively compete with a smaller number of engineering graduates; and I want the College of Engineering at Carnegie Mellon to lead the way.

*Dean Pradeep K. Khosla*