LESSON FROM THE SANDBOX

Children must start learning about engineering in the early grades.

Years of focus on increasing diversity in our universities has convinced me that elementary school is the time to start building the foundation for an engineering education. The best-intentioned diversity outreach and recruitment initiatives by engineering colleges nationwide has done little to increase awareness of the richly textured future that engineering education offers. Astonishingly, our national consciousness is not aware of the role that engineers play in medical research advances, in alleviating human suffering or in creating the iPod that put 10,000 tunes at our fingertips.

We’re engineers. We create things and are proud of it. Now we need to get the word out. And we need to concentrate on the kids. While we understand that innovative, technological breakthroughs occur at the convergence of disparate disciplines, we have drawn unnatural distinctions between collegiate engineering education and the K-12 educational experiences that drive both the preparation for and the passion of youngsters to pursue engineering. Our educational challenge is a design challenge: How do we “make” the right engineers for our time? Engineers must respond to sudden change, and yet we balk at transformative changes in our educational system.

Half of the U.S. population will soon be nonwhite, and engineering solutions will increasingly serve more-diverse consumers. So how do we recruit more native talent to the engineering fold? How do we overcome the challenges of women and minority students being conspicuously underrepresented in engineering? And more broadly, will today’s youngsters have the skills to thrive in a global, change-driven society? Our challenge is to design a seamless K-16 engineering system that integrates engineering with the liberal arts, so technological literacy is considered a component of basic literacy.

We must design an educational system that creates tomorrow’s leaders and a citizenry capable of analytical decision-making. We need people educated in cross-disciplinary, quantitative decision-making to be at the helm of developing new technologies and policies that shape both our nation’s economic future and our planet’s health. Today’s youngsters should not be just users of technology but future developers of responsible new technologies. So, what’s to be done?

Early and pervasive engineering experiences provide knowledge from which youngsters can make informed choices. K-16 engineering is about arming young adults with the ability to thrive in a technologically driven society and preparing them to understand the complexities of contemporary issues. We must move engineering beyond the stealth profession, guarding the excitement of it as the best-kept secret on the planet, and make engineering visible, exciting and relevant to the lives of K-12 youth and teachers.

We cannot simply harvest the brightest high school graduates; we are compelled to grow the talent to fuel our profession. We must build long-term relationships between our engineering colleges and K-12 schools, exploiting engineering as a vehicle for the integration of science and math learning in ways that connect youth to the joys, challenges and reality of a future in engineering. We must create experiences that help young people appreciate the wonders of engineering in their everyday lives and enable them to internalize engineering as a helping profession that speaks to their hearts.

The challenges are great, and so are the opportunities. It is imperative to our nation’s health to make bold and coherent K-16 choices for our profession. We face competition from low-wage, high-human-capital communities across the globe, and we must prepare for this wave of change by designing engineering education for a future that recognizes the interrelated K-16 system. We know what is possible; our challenge is to make the possible probable for our universities and beyond.

ACTION FIGURE
Today's engineering professor has to do it all.