Convey the importance of science

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A few years back, I was fortunate to have a very enlightening experience as a Jefferson Science Fellow at the U.S. Department of State. As senior science advisor for the Bureau of Western Hemisphere Affairs, I was considered the "Science Guy" who would contribute and assess policy discussions, and translate technical issues bearing on those policies for a non-technical but very intelligent audience. My work spanned the spectrum from agriculture and biofuels, to medicine and space science.

During my year-long fellowship, I became acutely aware of the following truth: Engineering educators need to do more to prepare students to communicate about engineering and the role of engineers to the general public and to those making policy decisions.

In today's world, there are any number of public policy issues such as climate change, cyber-vulnerability, transportation infrastructure, resilient and sustainable design, clean water, stem cell research, arms control, migration of pathogens and invasive species, and natural disaster mitigation and recovery in which some level of engineering literacy is required. Not necessarily to solve them, but simply to make rational policy decisions about them.

As a consequence, today's engineers and scientists will be called upon to articulate clearly and effectively for science in the formation of public policy. It is imperative that we prepare students to accept this role by providing them with the communications skills they will need in a global society. We must also prepare them to accept roles as ambassadors for science and engineering in the public discourse. We can afford to do no less.

Does this imply that we need to teach engineering to all of those non-engineers out there? That's neither possible nor desirable. But by creating greater awareness of, and appreciation for, the indispensable demand for engineering solutions to so many of the issues facing society today, we as engineers can serve that society far more effectively.
Science and technology are widely recognized as instruments of economic growth in advanced industrialized nations; once an economy achieves "developed" status, innovation is the only sustainable driver of economic growth.

For these economies, including the United States, engineers are "professional innovators" who build the national wealth. It is only through engineering that science grows into technology to serve society and, by doing so, becomes part of the economic fabric.

Observing developing nations that succeed in this regard, as I did as part of my studies at the State Department, provides compelling evidence for the importance of a well-developed and functioning national innovation system, as well as the need for societal technological learning and the increase in technical sophistication on the part of society as a whole.

The technical challenges that face us today are, in fact, opportunities to create significant wealth for those nations with capable, functioning innovation systems and the shrewdness to invest rather than sequester.

The risk of becoming dependent on others for technology looms for those who don't make those kinds of investments, because those who must buy technology are of necessity behind, and dependent on, those who create it.
This is where American research universities are essential. Their role is to undertake long-term, high-risk research of the type private enterprise cannot afford, but which society as a whole cannot afford to neglect. And the natural connection between research and graduate education, and the resulting flow-down of knowledge that enhances undergraduate education, produces more informed graduates at all levels.

As an engineering educator, I believe it is imperative to reaffirm the role of the American research university as part of a national investment strategy.

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