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What Higher Education Can Do to Unleash Innovation



WSJ Leadership Expert C. L. Max Nikias says that higher education needs more dual appointments to foster the kind of collaborative research needed to keep up with technological advances. *Photo: ISTOCK Photo*

By C. L. Max Nikias

From my perspective as an electrical engineer and president of one of our country's leading research universities, I have observed firsthand how quickly technology is moving today. We stand on the precipice of what the World Economic Forum calls the Fourth Industrial Revolution, in which technology will develop exponentially, blurring the lines between the physical, digital, and biological spheres.

There's no doubt that America's research universities will be the engines that drive this revolution, particularly in what is increasingly being referred to as the converged biosciences – medicine,

engineering and the life sciences. After all, with technology as an enabler, it is at the intersection of these disciplines that the greatest advances of this generation will come – all related to improving lives and extending lifespans.

Most institutions boast cross-discipline research programs. But few have aligned their organizations in a manner that supports the necessary paradigm shift from “working alongside” one's cross-discipline colleagues to “working together” with them. Too often, academics work in their respective silos, and may never even discuss their research with faculty in other

departments or schools until it has been completed and peer reviewed. By that time, key opportunities for collaboration have already been lost.

But the challenges go deeper. Consider this: Engineers are preoccupied with the material and systems world; scientists are preoccupied with the theoretical experimental world; and medical doctors are preoccupied with the human world, focused primarily on their patients' outcomes.

These disparate approaches represent not only a clash of methodologies, but also a clash of cultures. So how do we get our academic superstars to work together and

harness the technology that will enable the advances the world most needs?

As with most kinds of entities, the answer comes down to two things: human-resource alignment coupled with an incentive structure that matches the organization's objectives.

At my university, we have focused on the recruitment of transformative faculty who have been given joint appointments across two or more disciplines or schools. Many hold appointments with both our medical and engineering schools. Others add biology or chemistry to their portfolios. This approach has reaped significant benefits not just for us, but also for some of our peer institutions like MIT and Stanford, who have likewise become early adopters.

And as this trend becomes more commonplace in our country's leading institutions, I am confident that we will see an increase in the pace of new innovations. But to succeed, these multiple appointments should not be offered as a courtesy – they cannot be secondary appointments. Each appointment should be of equal weight, with specific expectations for multidiscipline execution.

Our blueprint for those who earn more than one appointment includes oversight of projects, centers or academies that bring together faculty members from the various disciplines they represent. This means that faculty from a number of different disciplines work with each other, often in the same location, under the guidance of leadership that has a multidiscipline mandate. Rather than cross-collaboration

opportunities opening at the end of a research cycle, the chance to ignite a new spark of cooperation can now present itself on a daily basis.

The performance reviews of those who have earned joint faculty appointments include metrics around how fluidly they and their teams are able to work across the academic units to which they belong.

A number of innovations have come as a direct result of this organizational strategy. Mark Humayun, a doctor and biomedical engineer who holds joint appointments with our engineering and medical schools, led a collaborative effort between engineers, doctors and biologists that in 2013, culminated in an FDA-approved artificial retina that restores sight to patients suffering from retinitis pigmentosa, a degenerative eye disease that affects roughly one in every 4,000 Americans.

More recently, Peter Kuhn, who holds joint faculty appointments in biological sciences and medicine, is leading a project that brings together doctors, engineers, scientists, designers and entrepreneurs to create a wearable technology that provide doctors with real-time patient cancer data. Dr. Kuhn and his team have also pioneered what has been called the liquid biopsy, a new noninvasive cancer screening tool that will revolutionize testing and treatment. These efforts are part of the White House's recently announced cancer moonshot initiative, which stresses the need for researchers from multiple disciplines to work together.

The Fourth Industrial Revolution promises to fundamentally reshape our world and our way of life through technology. But it will be the human factor, ultimately, that enables us to harness these coming technologies and deploy them for the common good. Promoting joint faculty appointments at our nation's research universities is an important step toward making this future a reality.



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