A Conversation with
Umesh Mishra

The personable and highly respected longtime UCSB professor shares his vision for building on the greatness of the COE

In July, after 33 years as a professor of electrical and computer engineering at UC Santa Barbara, **Umesh Mishra** began his tenure as the eighth dean of the UCSB College of Engineering. Raised in India by his father, an electrical engineer, and his mother, one of the first female doctors in the state of Odisha, he was educated in India and the United States, earning his PhD at Cornell University. He has won multiple prestigious awards and brings deep insights from his experience as an entrepreneur. Mishra is currently chief technical officer and board chair of Transphorm, which he co-founded in 2007, and he previously co-founded Nitres (1996), the first company to develop gallium nitride LEDs and transistors. We spoke with the new dean in September.

Convergence: *The College of Engineering (COE) is more than fifty years old. How do you assess where we are and where we are going?*

Umesh Mishra: Starting from **Robert Mehrabian,** we've had a continuum of excellent deans, who led the college rapidly into the top echelons of engineering schools. He established the Materials Department, now one of the very best in the world, while choosing not to have an undergraduate materials degree. That must have been a difficult choice, but it led to materials' becoming a stellar research department and faculty members' being able to participate in the undergraduate education of students in other disciplines.

Later, **Venkatesh "Venky" Narayanamurti** made the college more entrepreneurial and added a Certificate in Entrepreneurship, which grew into our unique and reputed Technology Management Department. He also emphasized computer science and computational engineering, both areas of immense importance today. Those are just a few examples of my predecessors' many wise actions.

I think that we've reached a point now when we have two choices: we can either cruise on our current trajectory or fire the afterburners. I see a unique opportunity to fire the afterburners. Our college has matured and translated several critical technologies in physical electronics materials and devices, soft materials, and polymers. More recently, however, the world has been rocked by the rapid rise of artificial intelligence, machine learning, big data, and the emergence of non-traditional computing, such as quantum computing. We have a unique opportunity at UCSB to apply those computing platforms across disciplines to serve a host of societal needs that are becoming more acute: sustainability writ large and climate change, automation and the future of work, security in a hyperconnected world, improving health and the quality of life, as just a few examples.

C: *What do you see for the COE moving forward?*
UM: I think we can reach the next level of greatness if we do two things. The first is to learn from our history. A lot of the things that we're good at today evolved more organically than organizationally, from the bottom up. Look at quantum computing, for which we've become well known. It came out of physics on campus, but it arose out of connections among multiple departments: physics, materials, electrical and computer engineering, and computer science. Being closely connected to the sciences, as we are, is of huge value for us in engineering. Because of what was done thirty years ago, we're positioned to do well in quantum computing, as evidenced by the NSF Quantum Foundry at UCSB. We should continue to encourage this sort of or-ganic, bottom-up path setting while responding in an agile manner to opportunities that arise.

The second is to increase our brand value and recognition worldwide so that we can increase the pipeline of exceptional faculty and students for whom the COE is their go-to academic enterprise.

C: *What's the key to that kind of "organic" growth?*
UM: For science to bridge the gap to technology requires that people talk to each other and be willing to work together and contribute something that might not be their core competency. Because we do that, we are able to, as I say, punch above our weight. In my own research group, we want everyone to be comfortable as both a leader and a follower. If you think you're always the leader, it's easy to become narcissistic, and if you think you're always a follower, nobody listens to you. But if you can span the two, you'll be much more effective. Communication, the key to collaboration, requires humility, a willingness to play second fiddle in some domains. That doesn't mean you're weak or a pushover. The culture of a college is built by people who are strong but also humble. I want to hire people like that. I'm not necessarily chasing the smartest person in the room, if that person undermines our culture. We want extremely bright, passionate people who believe in our culture.

C: *Do you have any big goals that you would like to accomplish as dean, something that would make you say, "That made a difference. I'm proud of that."*
UM: Three things: fund and build more research space, including Engineering III; develop a hybrid/online master's program in areas of strength to expand our impact; and expand our entrepreneurial focus. I believe that engineering has three purpos-es: to develop technology, to deploy science to develop technology, and to deploy technology for the service of mankind. I would consider my tenure as dean a major success if, at the end of it, we were deploying our technology to serve mankind. I be-lieve that we can leverage our collaborative culture to generate prototypes of products, which can then be taken into the marketplace through small com-panies. I'd like to see a collaborative prototyping center that brings in people from across campus, including the humanities, fine arts, and the social sciences, which can contribute so much to indus-trial design and to our understanding of the social acceptance of technology. We want to hire the best faculty and attract the best students to deliver an education that has the same goal at every level: to teach students how to use science to develop technology and take it to market.

C: *Does that vision connect to diversity?*
UM: Diversity is fundamental to everything. As we innovate for social impact, we are doing so for all human beings of every kind from every place and background. If we have a diverse campus, our graduates will develop technology informed by and serving the needs of a diverse population.

As a college, we must reflect society and truly embrace diversity. Otherwise, we can become isolated, elitist, out of touch, and irrelevant. I was raised in India with the caste system and inequality all around us. I grew up with a strong mother who became one of the first Indian medical doctors in my home state, while it was still British India. Women, like people from many underserved groups, especially minorities, have always had the ability to do great things, but they have too often lacked opportunity. We have to embrace the many diverse backgrounds and cultures people have and try to afford the opportunity for this great UCSB education to as many of them as we can.

That requires working hard at DEI. One advantage of being a small school is that we can recruit in person to address underrepresentation. I intend to visit high schools with [COE associate dean of undergraduate studies] **Glenn Beltz** and others and to evangelize about why UCSB is a place where a student from an underrepresented minority group will feel welcome, comfortable, and supported. I think that recruiting is the only way to move the needle on underrepresentation.

We cannot expect to reach our destination in a year — or even five years. We have to be glad just to move the needle continuously. When I used to go mountaineering in the western Himalaya Mountains, my teacher always told me, "Don't look up to the summit, because it's too far away." He advised, instead, to look down to see how far I'd climbed, and then just to take the next step. So, when I look at these mountains of important DEI issues, I know we have to keep climbing and not get disheartened by how distant the goal might be. If we work toward it, steadily and with focus, every step we take will be a win.

C: *What are some of the most important lessons you bring to academia as a tech entrepreneur?*
UM: In some ways, the College of Engineering is like a medium-sized business made up of numerous small businesses, with each faculty member running their own "company." Maybe the most important thing I've learned is that a successful business of any size requires a clear vision and a differentiated brand, and what I want to develop for the COE is a vision that is very clear but also broad enough so as not to box people in. The other element is the culture; a business that lacks a vision cannot develop a culture and will fail. Once you have clarity of vision and clarity of culture, then you have the energy to take your vision and spread it with willing partners. We have a great foundational culture in the college. Lastly and very importantly, as in any small business, we need to continually raise funds via philanthropy and other means, and the synchronicity between a differentiated and meaningful vision and a highly functioning culture can free us up to do that.