Tejal Desai: The evolution of engineering at Brown has been amazing to witness

At the end of her first academic year as dean, Tejal Desai reflects on what she learned and describes how Brown's School of Engineering is building on distinctive strengths to advance its academic enterprise.

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Photo by David Silverman.

PROVIDENCE, R.I. [Brown University] — Tejal Desai's first year as dean of the Brown University School of Engineering has been both a new beginning and a homecoming. The accomplished biomedical engineer and academic leader earned her bachelor's degree at Brown in 1994. Three decades later, she is now charged with leading the oldest undergraduate engineering program in the Ivy League and third oldest civilian undergraduate engineering program in the U.S. to new heights.

Since the elevation of the program to a school in 2018, engineering at Brown has experienced significant growth with the addition of new faculty, increased research funding and the construction of a state-of-the-art, 80,000-square-foot Engineering Research Center. Desai believes the school is poised to continue that growth with an expanded research and teaching enterprise, deepening collaborations on campus and beyond, and an increasingly diverse and inclusive community all on the short-term horizon.

Before joining Brown in September 2022, Desai held academic leadership positions at the University of Illinois at Chicago, Boston University and the University of California San Francisco, and served as a member of Brown's biomedical engineering advisory board. Her own research spans multiple disciplines including materials engineering, cell biology, tissue engineering and pharmacological delivery systems to develop new therapeutic interventions for disease.

At the end of her first academic year, Desai shared takeaways from year one and her plans for the future.

Q: Having been a student here in the 1990s, how have you seen the engineering program evolve in terms of students, research and mission?

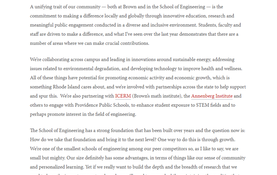
One big difference is that it wasn't a school. When I was studying engineering at Brown, it was really more of a concentration. To me, that's where I see the evolution. Today, engineering is central to a lot of the teaching, research and other activities that our students engage with at Brown. To see it as a hub of activity and just such a warm, open community is something that I did not see as much in terms of scale back then. There was still a tight-knit community, but we were much smaller. Its evolution into what it is today has been amazing to witness.

Q: You took many initial steps this year — hosting town halls, engaging with faculty, staff, student groups, campus leaders and partners — to learn about the breadth of research taking place across the school and collaborations across and beyond campus. What was your goal, and what did you learn?

A lot of what I wanted to do was to listen. Just because I had been here as an undergraduate 30 years ago didn't mean that I knew the pulse of the place today. Having things like town halls and meeting with a lot of our collaborators and campus leaders gave me a sense of where engineering was and, just as important, where engineering could be — our potential. That informed a lot of what I'm thinking about now in terms of research, education, and our greater community and societal mission.

Personally one of the big pieces of learning I've done throughout the year is balancing where we want to go with the processes of how to get there. It may not sound terribly exciting, but it's essential — and I'm an engineer, so I think about the structures and systems needed to make progress. In that vein, I'm learning how to take in all of the different things we want to do, prioritize them and then start to act on them.

For example, early on, as I spoke to people, I saw that as we continued to fully come back from the pandemic, the community was still grappling with the question of how to rebuild community. How do we regain those bonds and connections among faculty, staff and students? We still have some work to do, but we've tried to build community around our shared interests, such as having "Works in Progress" sessions where faculty share their current research, as well as more social gatherings.


Events like the Back to Brown alumni event in Hazelline Commons here helped rebuild a sense of community among students, faculty and alumni. Photo by Cherie Demski.

Q: Through all this learning, what impressions did you get of where the School of Engineering is set to go and the kind of impact its scholars want to have in Rhode Island and beyond?

A unifying trait of our community — both at Brown and in the School of Engineering — is the commitment to making a difference locally and globally through innovative education, research and meaningful public engagement conducted in a diverse and inclusive environment. Students, faculty and staff are driven to make a difference, and what I've seen over the last year demonstrates that there are a number of areas where we can make crucial contributions.

We're collaborating across campus and leading in innovations around sustainable energy, addressing issues related to environmental degradation, and developing technology to improve health and wellness. All of these things have potential for promoting economic activity and economic growth, which is something Rhode Island cares about, and we're involved with partnerships across the state to help support and spur this. We're also partnering with ICERM (Brown's math institute), the Annenberg Institute and others to engage with Providence Public Schools, to enhance student exposure to STEM fields and to perhaps promote interest in the field of engineering.

The School of Engineering has a strong foundation that has been built over years and the question now is: How do we take that foundation and bring it to the next level? One way to do this is through growth. We're one of the smallest schools of engineering among our peer competitors so, as I like to say, we are small but mighty. Our size definitely has some advantages, in terms of things like our sense of community and personalized learning. Yet if we really want to build the depth and the breadth of research that we need to have the impact we want and need, we will need to expand while maintaining the qualities that make us very special. This includes growing our faculty and our Ph.D. program.

Q: You've said that the School of Engineering is fundamental to the University's plan to substantially expand research and that you're positioning the school for success in this endeavor. What key steps have been taken so far?

First, we identified research areas where we can lead, be distinctive and make an impact. From there, we started to identify opportunities to bring our aspirations to fruition, including new grant programs, new collaborations, new connections with external agencies and industry to make sure faculty, staff and students have the resources, the time and the ability to address the huge societal challenges we are taking on.

We're in an era where technology is key to the solutions that we want to bring to bear. Much of our focus is going into the environment, health and energy. For example, in collaboration with different departments across campus, we have a new Initiative for Sustainable Energy. The initiative is meant to galvanize research in energy technology like kickstarting breakthrough technologies in sustainable battery systems, wind and water turbines, zero-carbon fuels and energy-efficient materials; it fits really nicely with what engineering is doing in terms of materials, new technologies and approaches to gain ground in a really important issue.

In the area of biomedical research and technologies, a lot of focus went into the first year of entities like the Institute for Biology, Engineering and Medicine, which formed last year. This institute stands at the intersection between engineering, medicine, health and biology and will help researchers bring to bear both technologies and computational approaches that can help us understand how to diagnose and treat disease.

The third area we've been revving up to expand is our research on the environment and climate change. We've been positioning ourselves so that over the next years, we're really ready to grow and partner even more with entities like the Institute at Brown for Environment and Society and the School of Public Health in thinking about how we can play a role in creating technologies that can be used for addressing issues like pollution, soil contamination and monitoring health.

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> **TEJAL DESAI** ⟶ dean of engineering, Brown University

Q: The school is also working on a review of its curriculum. What's the need there?

One of the things I noticed when I arrived is that the core curriculum in engineering has been largely unchanged over the last 40 years. As we start to think about the future of engineering — where technology is going, where the workforce is going — we need to consider the type of engineer that we want to educate and produce. What are those skills that will not just serve students in the short term, but in the long term?

Brown is a wonderful place to do that with the underpinnings of the Open Curriculum. This year, we launched a core curriculum taskforce that's been very active in talking to faculty, students, alumni and employers to get a sense of what are the best attributes of the engineering curriculum, where are things that we might want to enhance or add. We don't know what the problems will be in the future, but we want to teach our students to be able to think about how to solve them.

Desai congratulated winners at the School of Engineering Awards Dinner at Alumnae Hall during Commencement Weekend. Photo by Amy Simmons.

Q: Throughout your career, you've been recognized as a staunch advocate for diversity, equity and inclusion in engineering and academia. What are some of your priorities for the school in this area?

As we think about growth and expanding the faculty, where I'd love to focus on is making sure that we're reflecting society in terms of demographics. In that regard, I think we have a ways to go within the School of Engineering, both for gender representation as well as representation for those from historically underrepresented groups. Still, the school has made a lot of strides, especially with our students.

For example, we have one of the highest percentages of women in engineering at the undergraduate level, and we've been making inroads also with graduate students as well. One of our goals as we look to grow and expand our faculty will then be increasing diversity with new hires. Over the last couple of years, we have been starting to do that. Much of this year was spent really thinking about that process, from the composition of our search committees to the evaluation tools that we use.

Q: What's your favorite thing about being back at Brown? Is there anything that has surprised you?

Honestly, when I walk across campus, I smile because I just love this community environment. Being at a place like Brown is very inspiring. It's inspiring to me as a researcher, as an educator, and it was inspiring as a student. The energy and the enthusiasm of the students — the creativity that they bring and their desire to really change the world — is powerful and impactful. They are engaged in the Brown Design Workshop, they build satellites that are sent off to space, they create solutions for improving human health.

I'm still surprised by how collaborative and connected this place is. We're always thinking about ways in which we can work together. As somebody who is coming in also with their own research program, I instantly started to collaborate with engineers who I never would have thought I would because they're in completely different fields. I recently submitted a proposal with Lucas Caretta, who does quantum sensing and quantum materials, and Gang Xiao in physics — and I'm a biomedical engineer. That's a hallmark of what goes on here.

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