

ASSISTANT PROFESSOR OF ENGINEERING LUCAS CARETTA AND HIS TEAM SYNTHESIZE ATOMIC-SCALE THIN FILM QUANTUM MATERIALS TO TACKLE LARGE-SCALE TECHNOLOGICAL CHALLENGES.

Engineering for the Future

By Debra Bradley Ruder '80

Strategic vision for Brown's School of Engineering focuses on innovation, impact, collaboration and educating creative problem solvers.

Brown Assistant Professor of Engineering Theresa Raimondo, considered a rising star in the burgeoning field of immunoengineering, is designing nanoparticles to deliver new RNA-based therapies to the human body. She aims to stimulate the immune system to accomplish two medical missions: promote tissue regeneration and kill cancer cells.

A 2011 Brown graduate who joined the faculty in 2024, Raimondo was attracted to the School of Engineering's uniquely collaborative environment, where engineers work with colleagues across the school and University to address complex challenges. She now interacts with experts at Brown's RNA Center, Legorreta Cancer Center, Warren Alpert Medical School and beyond to pursue her goals and ultimately benefit patients.

Cutting-edge work like Raimondo's is happening throughout the engineering school, and Sorensen Family Dean Tejal A. Desai plans to keep the momentum going — building on successful efforts to recruit stellar faculty, foster innovation and create a welcoming community. Desai's vision focuses on making a real-world impact, cultivating the next generation of engineers, and spurring innovative marriages of expertise, as reflected in research on immunoengineering.

Brown's relatively small scale and the boundaries avoided by the school's lack of traditional departments "really enables these collaborations," says Desai, engineering dean since 2022. "I think that's going to be our secret sauce: to bring together ideas and people who are collaborative and interdisciplinary and want to work on important problems."

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Research Impact

Engineers are driven to find solutions, and school leaders have identified three research areas for continued growth: sustainability, health innovation and next-generation materials and sensing technologies.

Investigations are underway, for example, to improve renewable energy battery storage, clean up environmental pollutants, build krill-inspired robots for underwater navigation, provide more efficient computing systems, and study nanoscale thin films with promise for large-scale applications. Among health-related projects, Brown faculty are engineering cardiac tissue to treat heart damage, developing wearable devices to predict brain injuries and designing a method to accurately measure blood oxygen levels across different skin tones.

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— Sorensen Family Dean of Engineering
Tejal A. Desai

Despite federal cutbacks to scientific research at universities, Brown's engineering scholars are committed to pressing forward.

"The more we dive into these research areas, the more we realize there's so much to learn," says Professor Kimani Toussaint, senior associate dean for research and strategic initiatives. "That's super exciting, because you start to see how this work could transform our world."

Partnering with Industry

Boosting opportunities for translating research discoveries made at Brown to the marketplace are part of Desai's vision for the school's future.

"Building stronger industry interactions is a key priority going forward," notes Desai, an accomplished biomedical engineer who graduated from Brown in 1994. "There are important benefits to getting the work we do out into the real world."

To that end, the school has piloted capstone classes in which seniors build, program and analyze a wireless communication

system through a partnership with a leading semiconductor company. And Brown has joined a consortium of New England universities to help scientists and engineers transform inventions to commercial technology more quickly.

Educating for the Future

To engage more students in engineering, the school has redesigned its introductory course and begun a pre-orientation program to help undergraduates transition academically into the rigor of their studies.

It has also expanded hands-on learning experiences for students. A new concentration and master's program in design engineering — which appeals to learners who enjoy making things — aims to position Brown as a leader in this specialty, according to Desai. In a fully donor-funded project, the University is also creating an Innovation Hub that will house the Brown Design Workshop, a makerspace filled with gear for creativity and collaboration.



IN THE BROWN DESIGN WORKSHOP, STUDENTS DEVELOP A MODEL FOR THE STAINLESS-STEEL SUNDIAL SCULPTURE, "INFINITE POSSIBILITY," THAT NOW STANDS IN FRONT OF THE ENGINEERING RESEARCH CENTER.

Engineering students are encouraged to explore other subjects and understand not just the technical aspects of engineering but also "where engineering technologies can be applied, who is impacted and how they can be deployed to benefit society," Desai notes.

Desai is committed to ensuring that all students get the support they need to flourish. "I believe that engineering is central to a great liberal arts institution," she says. "The growing interest among students in doing engineering the Brown way is really exciting."