The joys of engineering (and 1.1 million views)
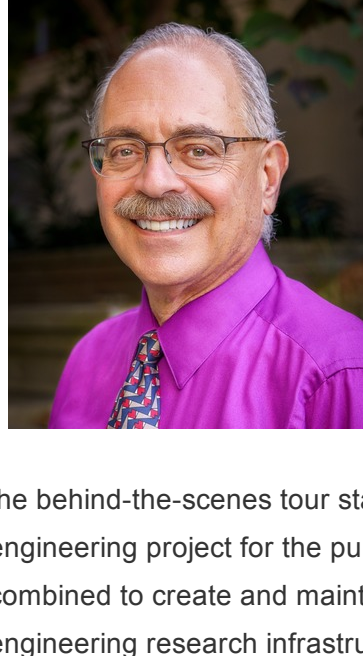
The joys (and challenges!) of engineering are palpable in a new video about our earthquake simulator from YouTuber Tom Scott. The first two minutes of the video set the stage for a fun and enlightening tour of our shake table with operations manager Koorosh Lotfizadeh, who is also a UC San Diego structural engineering alumnus. The video is called "Shake tables are way more complex than I thought," and it already has more than 1.1 million views. If you watch it, you'll understand why.

As an engineering dean, I'm especially interested in the conversation that begins at about the two minute mark. That's when the behind-the-scenes tour starts and we get to see both the joys and challenges of a complex engineering project for the public good. We see engineering theory and engineering practice combined to create and maintain critical research infrastructure. We get a unique perspective on engineering research infrastructure that is being used to help us increase the resilience of our built infrastructure in the face of a wide range of natural hazards – and ultimately help us save lives.

In the Tom Scott video, we also see joy that comes from moments of mutual technical understanding. We see successful communication of both the "what" and the "why" of this complex engineering project. In a past column, I talked about the importance of practice and the importance of finding your "why" as part of engineering and computer science education.

The full-scale 10-story mass timber building being shaken in the video is the centerpiece of the NHERI Tallwood project, funded by NSF. This project aims to increase safety and resilience of future engineered-timber construction techniques for mid and high rises while reducing carbon footprints.

Our shake table teams past and present have achieved incredible feats. The NSF-funded shared-use facility is a powerful example of deep collaboration between our faculty and research teams and a whole cast of characters including other academic teams, federal and state funding agencies, industry partners, government agencies, and philanthropic donors.

I am proud to see some of the human ingenuity and creativity that is essential for the success of the shake table highlighted in this video. Now more than ever, we need to make sure that wider audiences understand both the "what" and the "why" of university-based engineering projects. Doing this is part of our mission at the Jacobs School to advance engineering and computer science for the public good.

As always, I can be reached at DeanPisano@ucsd.edu.

Sincerely,

Al

Albert ("Al") P. Pisano, Dean
UC San Diego Jacobs School of Engineering

Earthquake simulator in the spotlight

As Dean Pisano mentioned above, engineering theory and engineering practice have been essential to the creation and upgrades of our outdoor earthquake simulator, which is part of the Department of Structural Engineering here at the UC San Diego Jacobs School of Engineering. The video tour with YouTuber Tom Scott offers a unique engineering-focused perspective on this shared-use experimental facility that is part of NSF Natural Hazards Engineering Research Infrastructure. Information on industry and academic collaboration opportunities are available on the UC San Diego Englekirk Structural Engineering Center website.

Watch the video

Landmark UC San Diego seed investment bolsters campus spinoff

In a first-of-its-kind investment, UC San Diego is offering seed funding directly to one of its most promising startups. The $250,000 seed investment in LIMBER Prosthetics and Orthotics Inc. represents a strategic expansion of UC San Diego's robust innovation ecosystem. LIMBER is revolutionizing access to prostheses for amputees and physicians by making the world's first single piece, 3D printed, below-the-knee prosthetic limb. LIMBER was co-founded by structural engineering doctoral students Joshua Pelz and Luca De Vivo Nicoloso at the UC San Diego Jacobs School of Engineering, along with Herb Barrack, a certified prosthetist and orthotist. The seed investment from UC San Diego is funded by philanthropic support from the Legler Benbough Foundation, which gave $1 million to UC San Diego's Institute for the Global Entrepreneur (IGE) to support entrepreneurship-related initiatives.

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Increasing diversity in electrical engineering graduate programs

A new pilot program, funded by a gift from Intel Corporation, aims to increase diversity in electrical engineering graduate programs. The pilot invests in electrical engineering faculty, programs, and infrastructure at minority-serving institutions to enhance their ability to educate more students who are well-prepared for graduate studies. As part of the pilot, UC San Diego is collaborating with Florida A&M University and the University of Texas at El Paso, which are both core members of the Inclusive Engineering Consortium (IEC), a non-profit organization that brings together academia, industry, and government to advance electrical and computer engineering education, research, and careers. UC San Diego electrical and computer engineering professor Truong Nguyen co-created and leads the program.

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Spread the word: Applications open nationwide for NextProf Pathfinder

First and second year Ph.D. students, and master's students intending to apply to a Ph.D. program, are invited to apply for the 2023 NextProf Pathfinder Future Faculty Workshop running from Oct. 22 to 24, 2023. Participants learn what it takes to build a competitive graduate school record to obtain a faculty position in the engineering professoriate. NextProf Pathfinder is open to all. People from backgrounds historically underrepresented in the engineering and computer science professoriate are encouraged to apply. There is no cost to students for the program, thanks to sponsorship from the UC San Diego Jacobs School of Engineering, University of Michigan and Georgia Tech. Applications close on July 20. Read an article about the 2022 NextProf Pathfinder Future Faculty Workshop.

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First endowed chair awarded to a UC San Diego teaching professor

Christine Alvarado, associate dean in UC San Diego's Division of Undergraduate Education, and a Teaching Professor in the Computer Science and Engineering Department at the Jacobs School, holds the inaugural Paul R. Kube Endowed Chair of Computer Science. Alvarado is the first teaching professor at UC San Diego to hold an endowed chair. Her scholarly efforts focus on improving inclusion and diversity in computer science education, and her teaching is renowned. "The praise that students have for Professor Alvarado's teaching is inspiring – she truly exemplifies the student-centered values that our institution stands for," said computer science department chair Sorin Lerner. The Paul R. Kube Endowed Chair was funded by a gracious gift by longtime UC San Diego supporter Taner Halıcıoğlu (CSE '96) to enhance the department's educational mission.

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Extremely low-cost blood pressure monitoring

UC San Diego electrical engineers have developed a simple, low-cost clip that uses a smartphone's camera and flash to monitor blood pressure at the user's fingertip. The clip works with a custom smartphone app and currently costs about 80 cents to make. The researchers estimate that the cost could be as low as 10 cents apiece when manufactured at scale. The technology was published May 29 in Scientific Reports, and the team readers are working to move this technology out into the world, where it can help people, via their startup company Billion Labs. The team's approach is particularly unique in that users don't need to take traditional cuff readings to tune the system. Read more in The San Diego Union Tribune and watch coverage on CBS News.

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Wearable ultrasound goes wireless

UC San Diego nanoengineers recently reported the first fully wireless wearable ultrasound system. Wearable, wireless ultrasound systems capable of sensing deep inside human tissues hold great promise for real-time monitoring of the heart, lungs and other critical systems while the person is exercising or otherwise moving. The new wireless system is reported in Nature Biotechnology. The new ultrasonic system-on-patch allows continuous tracking of physiological signals from tissues as deep as 164 mm, continuously measuring central blood pressure, heart rate, cardiac output, and other physiological signals for up to twelve hours at a time. Read more in IEEE Spectrum.

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UC San Diego robotics shines

Researchers at the UC San Diego Contextual Robotics Institute recently presented 16 papers at the ICRA 2023 conference. The conference, organized by IEEE, brings together academics, researchers and industry representatives. "This is a strong showing from our robotics faculty. I am looking forward to even more research breakthroughs and interdisciplinary collaboration as our faculty has moved into Franklin Antonio Hall, which is designed to boost the circulation of people and ideas even further," said Henrik Christensen, director of the UC San Diego Contextual Robotics Institute and a UC San Diego computer science professor.

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Improving autonomous vehicle cybersecurity

Millimeter wave (mmWave) radio frequencies are often used in assisted driving and self-driving features of modern cars. This connectivity can expose these vehicles to potential cyberattacks. To help improve the safety and security of autonomous vehicles, a team led by UC San Diego electrical engineers devised a novel algorithm designed to mimic an attacking device. The algorithm, described in the paper "mmSpoof: Resilient Spoofing of Automotive Millimeter-wave Radars using Reflect Array," lets researchers identify areas for improvement in autonomous vehicle security.
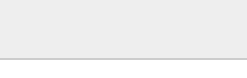
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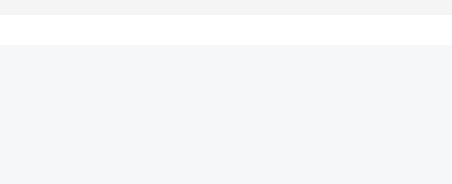
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