UC San Diego
JACOBS SCHOOL OF ENGINEERING

MONTHLY NEWS MAY 2021

Innovation at the Interfaces

Jacobs School engineers have developed sensors that surgeons place directly on the brains of people undergoing certain brain tumor and epilepsy surgeries. For me, engineered materials in direct contact with the human brain is a powerful visual regarding the responsibilities we have as engineers and computer scientists.

I'm particularly drawn to this mental image of a flexible mat of sensors following the surface of the human brain without piercing tissue. As an engineering dean, I build and protect interfaces between and among students, faculty, staff, industry and government partners, funders, and friends of the Jacobs School. Every interface is important, even if the short-term stakes are not as dramatic as sensors on a brain.

As our campus community prepares to carefully dial up the percentage of our interactions that are in person, I'm more focused than ever on the quality and impact of all our interactions—in person and virtual, synchronous and asynchronous.

For example, I'm proud of the interfaces we have created to introduce a wide diversity of engineering and computer science undergraduates to academic research. We open research doors to our undergraduates while prioritizing communication, self reflection, teamwork, and the big-picture WHY of the research.

Giving people opportunities to understand the big-picture WHY of the research is critical in so many contexts. In fact, it's central to my vision for a National Network of Innovation Centers. One of my big picture goals is to more deeply connect undergraduates, graduate students and postdocs to the WHY through expanded virtual access to researchers and research infrastructure, to industry pain points, and to testbed facilities across the nation.

At the same time, we need to get as many innovators under the tent as possible. It's not good enough for the same number of people to get smarter. We need to ensure that tomorrow's innovation workforce truly reflects society, and we need to create new ways to engage would-be innovators who are following a wide variety of paths.

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

Sincerely,

-Al

Albert P. Pisano, Dean

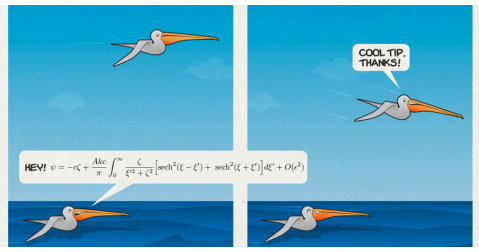
UC San Diego Jacobs School of Engineering

Diversifying the ranks of engineering faculty

The Jacobs School of Engineering has partnered with the University of Michigan to strengthen a program that addresses the lack of diversity in engineering academia. The program, NextProf Pathfinder, engages first and second-year PhD students, as well as master's students, in an effort to keep them open to pursuing careers in academia. To date, more than 144 women and people from underrepresented groups who attended its workshops have achieved tenure-track faculty positions. UC San Diego is the third institution to partner with Michigan Engineering on a NextProf program.

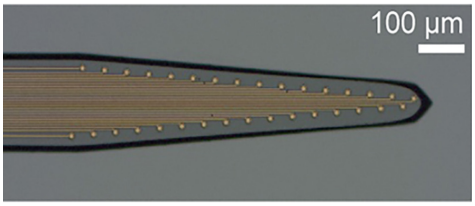
Learn more: bit.ly/UCSDNextProf

The math behind how pelicans glide above the waves



It's a common sight: pelicans gliding along the waves, right by the shore. These birds make this kind of surfing look effortless, but actually the physics involved that give them a big boost are not simple. Engineers at UC San Diego and oceanographers at the UC San Diego Scripps Institution of Oceanography developed a theoretical model that describes, for the first time, how the ocean, the wind and the birds in flight interact. The model could be used to develop better algorithms to control drones that need to fly over water for long periods of time.

Learn more: bit.ly/ucsdpelicanflight



Neural implant monitors multiple brain areas at once

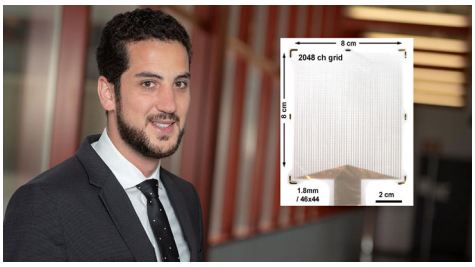
How do different parts of the brain communicate with each other during learning and memory formation? A new study by engineers and neuroscientists at UC San Diego takes a first step at answering this fundamental neuroscience question. The study was made possible by developing a neural implant that monitors the activity of different parts of the brain at the same time, from the surface to deep structures—a first in the field.

Learn more: bit.ly/NeuroFITM

Building a voice assistant for older adults

Computer scientists at UC San Diego received an Amazon Research Award to develop a voice assistant to better communicate with older adults. Their initial goal is to create a system capable of understanding and answering the medical questions of adults over age 65. This project is part of the larger VOLI effort (Voice Assistant for Quality of Life and Healthcare Improvement in Aging Populations) led by natural language processing computer scientists, along with geriatric physicians, and human computer interaction researchers at UC San Diego.

Learn more: bit.ly/OlderVoiceAssistant



Customized brain maps improve cancer surgeries, epilepsy treatments

A UC San Diego team of engineers, surgeons, neuroscientists, and medical device developers is working together to create better customized maps prior to brain tumor removal surgery. In particular, the team is focused on improving the performance of the flexible mats of sensors that rest directly on the surface of the brain while not puncturing that surface. These new grids of sensors are also being used to improve epilepsy treatments. Shadi Dayeh, a professor of electrical and computer engineering, and his team have improved these sensor systems in multiple ways, and their work has been used in the operating room.

Learn more: bit.ly/BrainSensors