UC San Diego JACOBS SCHOOL OF ENGINEERING

\$1.54 billion...talk about a heavy lift

UC San Diego recently announced \$1.54 billion in sponsored research funding for the 2021 fiscal year. Talk about a heavy lift!

This is the largest sponsored research amount ever for UC San Diego and the 12th consecutive year the campus has earned more than \$1 billion in research funding.

Everyone who worked so hard for these incredible results despite the headwinds deserves a lot of credit. I'm particularly proud because this is the Jacobs School of Engineering's home ecosystem...and we are fully engaged.

I have a simple schematic that conveys my perspective on the connectivity of the UC San Diego research ecosystem.

What I find so exciting about engineering and computer science is that we get to collaborate to expand knowledge, solve problems, and find cures AND we get to build systems and tools that allow others to do all that and more. These cycles of fundamental and applied research projects combined with tool building and invention are only possible when we intensively collaborate.

I often focus on how the Jacobs School knows how to collaborate with industry partners. That's true. It's also true that we apply the same intensity to collaborations within UC San Diego. Campus collaborations expand the scope of our intellectual inquiry. They broaden our perspective and make us more effective in our bedrock mission of leveraging engineering and computer science for the public good.

If you'd like to talk about ways to connect with the Jacobs School, I can be reached at DeanPisano@eng.ucsd.edu

∽Albert P. Pisano, Dean

UC San Diego Jacobs School of Engineering

\$12.25M NIH grant to improve epilepsy treatment

The National Institutes of Health has awarded a \$12.25 million grant to UC San Diego to develop and enhance brain-sensing and brain-stimulating platform technologies to enable treatment of drug-resistant epilepsy. The project is led by electrical engineering professor Shadi Dayeh and brings together expertise from all across UC San Diego, including the Jacobs School of Engineering and Health Sciences. The nation-wide team includes researchers at Massachusetts General Hospital and Oregon Health & Sciences University. The team is using materials science and technology integration advances to allow for sensor grids that rest directly on the surface of the brain and offer the possibility of providing surgeons with a much clearer picture of the spots in the brain likely initiating the epileptic seizures.

Learn more: bit.ly/NIHepilepsygrant

Fridge-free COVID-19 vaccines, grown in plants and bacteria

Nanoengineers at UC San Diego are developing COVID-19 vaccines that don't require refrigeration. Their key ingredients? Viruses from plants or bacteria. These fridge-free vaccines are still in the early stage of development. In mice, the vaccine candidates triggered high production of neutralizing antibodies against SARS-CoV-2, the virus that causes COVID-19. If they prove to be safe and effective in people, the vaccines could be a big game changer for global distribution efforts, including those in rural areas or resource-poor communities.









Researchers develop first steerable catheter for brain surgery

A team of mechanical engineers and physicians at UC San Diego has developed a steerable catheter that for the first time will give neurosurgeons the ability to steer the device in any direction they want while navigating the brain's arteries and blood vessels. The steerable catheter was successfully tested in pigs at the Center for the Future of Surgery at UC San Diego. The device was inspired by nature, specifically insect legs and flagella—tail-like structures that allow microscopic organisms such as bacteria to swim.

Learn more: <u>bit.ly/steerablecatheterrelease</u>





Bringing the fastest version of 5G to your home and workplace

We're one step closer to 5G connectivity that is ultra-fast and reliable at the same time, thanks to UC San Diego engineers who developed a system that enables millimeter wave signals to overcome blockages while providing high throughput. Electrical engineering professor Dinesh Bharadia and his team, who are part of the Center for Wireless Communications, came up with a clever solution: split the one laser-like millimeter wave beam into multiple laser-like beams, and have each beam take a different path from the base station to the receiver. The idea is to improve the chances that at least one beam reaches the receiver when an obstacle is in the way.

Learn more: bit.ly/mmwave5G

Ultrasound remotely triggers immune cells to attack tumors in mice

Bioengineers at UC San Diego have developed a cancer immunotherapy that pairs ultrasound with cancer-killing immune cells to destroy malignant tumors while sparing normal tissue. The work addresses a longstanding problem in the field of cancer immunotherapy: how to make CAR T-cell therapy safe and effective at treating solid tumors.

Learn more: bit.ly/UltrasoundCAR-T





\$2.7M NSF grant to make battery manufacturing waste-free

A team led by nanoengineers at UC San Diego has been awarded a \$2.7 million grant from the National Science Foundation to develop an eco-friendly and low-cost manufacturing process for sodium all-solid-state batteries. The process will be used to create large-scale energy storage systems—for buildings, electric grids, and wind and solar farms—that are more efficient, affordable and safe. To improve today's sodium all-solid-state battery manufacturing processes, the nanoengineers will develop a dry fabrication technology that eliminates the use of caustic organic solvents. The technology will also recycle materials—specifically electrodes and solid-state electrolytes— from used batteries to create new battery materials.

Learn more: bit.ly/WasteFreeBatteryManufacturing

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Contact newsletter editor, Daniel Kane: dbkane@ucsd.edu

UC San Diego - Jacobs School of Engineering Monthly News for September 2021- jacobsschool.ucsd.edu