NanoEngineering hits its stride

A new virtual issue of ACS Nano adds to the growing momentum in nanoengineering, chemical engineering and materials science here at the Jacobs School of Engineering.

The special issue builds on the momentum of our $18 million NSF MRSEC (Materials Research Science and Engineering Center). The UC San Diego MRSEC connects chemical engineering, nanoengineering and materials science with biology, chemistry, physics and computational sciences in new ways aimed at turning breakthroughs into innovations that strengthen US industries. The UC San Diego MRSEC is a validation of the Jacobs School's forward-thinking strategy to officially link, nearly 15 years ago, our NanoEngineering Department and our Chemical Engineering Program.

The ACS Nano special issue looks to the past and future of our nanoengineering department and serves as a mini-review of high profile research and education projects.

Institute for Materials Discovery and Design

Our nanoengineering and chemical engineering faculty and students are also central to UC San Diego's Institute for Materials Discovery and Design (IMDD). I invite you to join us on September 29 for a virtual launch of this new Institute, which we created in partnership with the Division of Physical Sciences. Nobel Laureate Professor Stan Whittingham will give the keynote. Whittingham was key to the discovery of intercalation chemistry and the design of lithium-ion batteries. Register for this free event here.

Breakthroughs to innovations

The tremendous headwinds brought on by COVID-19 have sharpened my thinking on how to better empower our students, staff and faculty to more effectively turn the breakthroughs we make into innovations that serve the public good. Much more to come on this topic in the future. In the meantime, I can alway be reached at DeanPisano@eng.ucsd.edu

You make engineering matter

Engineering and computer science education and research matter more now than ever. I'd like to thank the Jacobs School staff and faculty for the incredible work that each of you do — so much of it behind the scenes. Your efforts make all the difference.

Take care and stay safe. We are all in this together.

-Albert P. Pisano, Dean

UC San Diego Jacobs School of Engineering

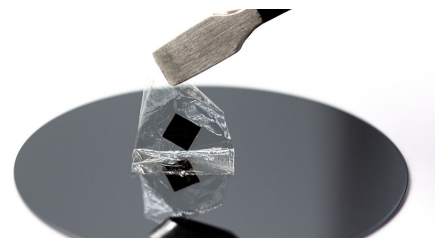## Blood test can detect cancer four years before conventional methods

UC San Diego bioengineers are central to an international effort to develop a non-invasive blood test to detect cancer well before symtpons surface. The test can currently detect whether an individual has one of five common types of cancers, four years before the condition can be diagnosed with current methods. The test detects stomach, esophageal, colorectal, lung and liver cancer. The work was led by Kun Zhang, professor and chair of the Department of Bioengineering, and Singlera Genomics, a startup he co-founded to translate this work to the clinic.

Learn more: bit.ly/Panseer2020

Single-crystal perovskite devices closer to viability

Nanoengineers at UC San Diego developed a new method to fabricate perovskites as single-crystal thin films, which are more efficient for use in solar cells and optical devices than the current state-of-the-art polycrystalline forms of the material. The new fabrication method is especially promising because it uses standard semiconductor fabrication processes. It results in flexible single-crystal perovskite films with greater efficiency and enhanced stability than their polycrystalline counterparts. The advances, published in Nature, could lead to inexpensive perovskites for solar cells, LEDs, and photodetectors.

Learn more: bit.ly/SingleCrystalPerovskites

Working toward an anti-racist institution

We're dedicated to making the Jacobs School of Engineering, and UC San Diego overall, an anti-racist learning and research community. As part of this ongoing effort, we're sharing resources compiled as part of the UC San Diego Chancellor's 21-Day Anti-Racism Challenge. The concept was created by diversity scholar Dr. Eddie Moore, Jr. to promote deeper understandings of race, power, privilege, supremacy, and oppression. Why 21 days? It takes 21 days to create a habit and this initiative aims to support us in building "effective social justice habits" to effect meaningful change..
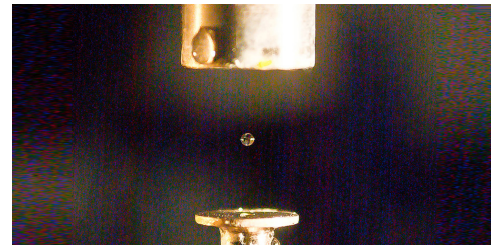
Learn more: diversity.ucsd.edu

Graeve earns Presidential award for STEM mentorship

Olivia Graeve, a UC San Diego professor of mechanical and aerospace engineering, has received the Presidential Award for Excellence in Science, Mathematics and Engineering Mentoring from the White House. The award honors extraordinary individuals whose efforts have helped provide underrepresented groups with access to opportunities in STEM. Graeve is recognized for her role as the director of the IDEA Engineering Student Center; her work promoting binational research opportunities for high school and college students across the U.S–Mexico border; and her efforts within the Society of Hispanic Professional Engineers to increase opportunities for Hispanic students and faculty.

Learn more: bit.ly/GraevePAESMEM

Model connects respiratory droplet physics with spread of Covid-19

Respiratory droplets from a cough or sneeze travel farther and last longer in humid, cold climates than in hot, dry ones. This is according to a study on droplet physics by an international team of engineers including Jacobs School mechanical and aerospace engineering professor Abhishek Saha. The researchers incorporated this understanding of the impact of environmental factors on droplet spread into a new mathematical model that can be used to predict the early spread of respiratory viruses including COVID-19, and the role of respiratory droplets in that spread.

Learn more: bit.ly/DropletPhysics

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