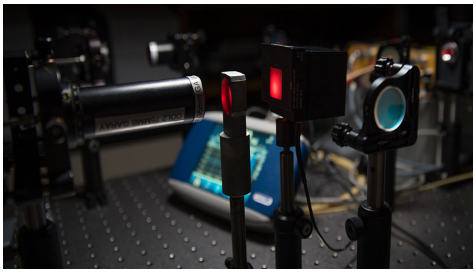
UC San Diego
JACOBS SCHOOL OF ENGINEERING

MONTHLY NEWS SEP 2019



Welding ceramics with lasers, no furnace required

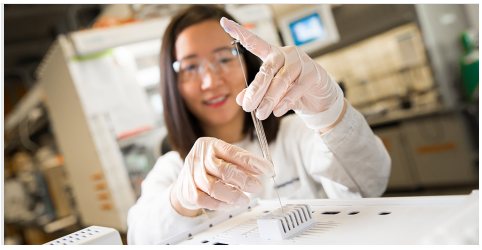
A team of engineers led by UC San Diego has developed a new ceramic welding technology that uses ultrafast pulsed lasers instead of extremely high temperatures to melt ceramic materials along the interface and fuse them together. Ceramics have been fundamentally challenging to weld together because they need extremely high temperatures to melt, exposing them to temperature gradients that cause cracking. Ceramic materials are of great interest because they are biocompatible, and extremely hard and shatter resistant. This new method could enable smartphones that don't scratch or shatter, metal-free pacemakers, and electronics for harsh environments.

Learn more: bit.ly/LaserWeldCeramics

Finding illegal devices at gas pumps

Computer scientists at UC San Diego developed an app that makes it easy for state and federal inspectors to detect devices that criminals install in gas pumps to steal consumer credit and debit card information. The devices, known as skimmers, use Bluetooth to transmit the data they steal. The app, called Bluetana, detects the Bluetooth signature of the skimmers, and allows inspectors to find the devices without needing to open up the gas pumps. Bluetana was developed with technical input from the United States Secret Service and is being used by agencies in several states.

Learn more: bit.ly/bluetanastory



Why do lithium metal batteries fail? Now we know.

A research team led by nanoengineers at UC San Diego has discovered the root cause of why lithium metal batteries fail—bits of lithium metal deposits break off from the surface of the anode during discharging and are trapped as "dead" or inactive lithium that the battery can no longer access. The discovery, published in Nature, challenges the conventional belief that lithium metal batteries fail because of the growth of a layer, called the solid electrolyte interphase, between the lithium anode and the electrolyte. The findings could pave the way for bringing rechargeable lithium metal batteries from the lab to the market.

Learn more: bit.ly/InactiveLithium

New bioengineering master's degree bridges engineering and medicine

The UC San Diego Department of Bioengineering is launching a new master's degree meant to provide engineering students with exposure to the practice of medicine. The Master of Science in Bioengineering; Medical Specialization is a one-year program at the Jacobs School of Engineering that will prepare engineering students for careers in the biomedical industry, or bolster students' clinical exposure in preparation for medical school. The UC San Diego Department of Bioengineering ranks 5th in the nation.

Learn more: bit.ly/BioMedMS

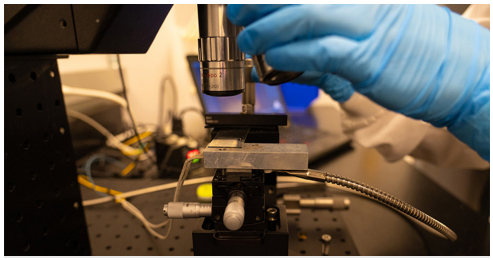
Simulating softness

What factors affect how human touch perceives softness? Engineers and psychologists at UC San Diego explored this question, and discovered clever tricks to design materials that replicate different levels of perceived softness. The findings provide fundamental insights into designing tactile materials and haptic interfaces that can recreate realistic touch sensations, for applications such as electronic skin, prostheses and medical robotics.

Learn more: bit.ly/SoftnessFormula

Thinnest optical waveguide channels light within just 3 layers of atoms

Engineers at UC San Diego have developed the thinnest optical device in the world—a waveguide that is three layers of atoms thin. The work is a proof of concept for scaling down optical devices to sizes that are orders of magnitude smaller than today's devices. It could lead to the development of higher density, higher capacity photonic chips.



Learn more: bit.ly/ThinnestWaveguide

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