

2018 Snapshot: the Jacobs School of Engineering

Engineering innovation doesn't "just happen." True advances that serve society take clear-eyed determination, technical smarts, creativity, and the openness to collaborate across disciplines. That's how we work at the Jacobs School. Our faculty have the highest per capita research funding of any public engineering school in the nation. We work with industry partners to tackle the challenges that no lab, department or company can handle alone. In 2016-17, the Jacobs School's research funding grew to \$178 million. Over the last four years, we've hired more than 75 faculty, bringing the total to nearly 250. Our total student enrollment is more than 8,600; and we continue to grow our graduate student body. At the Jacobs School, we get things done. Take a look at our 2018 Jacobs School Snapshot PDF.

Learn more: bit.ly/snapshot2018



Research center integrates hardware, software and data



The UC San Diego Center for Machine-Integrated Computing and Security is an industry-focused research center that integrates hardware, software, algorithms and data for scalable analytics and security. Electrical engineering professors Farinaz Koushanfar and Tara Javidi lead the center. Fundamental research questions and tough real-world challenges facing industry partners are pursued in parallel. Areas of active research include real-time data analytics, automated acceleration and adaptive training of deep learning, and security and privacy for cyber-physical systems.

Learn more: bit.ly/micspdf

Hardware security spinout raises \$2 million

The hardware security company Tortuga Logic, which was co-founded by UC San Diego computer science professor Ryan Kastner and two computer science alumni, recently raised \$2 million in seed funding from Eclipse Ventures. Tortuga Logic offers hardware design tools to identify security vulnerabilities throughout the process of designing semiconductors. Tortuga Logic's technology, based on research carried out in Kastner's lab at the Jacobs School, identifies and prevents security vulnerabilities in system-on-chip (SoC) designs. In the wake of the #Meltdown and #Spectre vulnerabilities, Tortuga Logic posted the following whitepaper on its website: "Identifying Isolation Issues in Modern Microprocessor Architectures."

Learn more: bit.ly/TortugaSeed



Approximately 1% of websites suffer data breaches



Computer scientists at UC San Diego built and successfully tested a tool for detecting when websites are hacked - by monitoring the activity of email accounts associated with them. The researchers found that almost 1 percent of the websites they tested had suffered a data breach. Given that there are over a billion sites on the Internet, this means tens of millions of websites could be breached every year. The team of researchers led by Jacobs School computer science professor Alex Snoeren presented the tool at the ACM Internet Measurement Conference in London. The computer scientists had a few pieces of advice for Internet users: don't reuse passwords; do use a password manager; and ask yourself how much you really need to disclose online. "Websites ask for a lot of information," said Snoeren. "Why do they need to know your mother's real maiden name and the name of your dog?"

Learn more: bit.ly/TripwireJS

Shirley Meng Named to new Zable Endowed Chair in Energy Technologies



Nanoengineering professor Shirley Meng has been appointed the inaugural holder of the Zable Endowed Chair in Energy Technologies in the UC San Diego Jacobs School of Engineering. As director of the UC San Diego Sustainable Power and Energy Center, Meng is leading efforts to advance solutions to some of the key technical challenges associated with energy generation, storage and power management. This endowed faculty chair was established by a bequest from the late Cubic founder Walter J. Zable and his wife, Betty. The Zables were longtime supporters of UC San Diego, giving to a variety of campus areas and initiatives.

Learn more: bit.ly/ZableEndowedChair

Sopping up molecules that trigger sepsis

Nanoengineers at UC San Diego have developed macrophage “nanosponges” that safely absorb and remove molecules from the bloodstream that are known to trigger sepsis. These nanosponges are nanoparticles cloaked in the cell membranes of a type of white blood cells called macrophages. These nanosponges serve as traps for a broad spectrum of sepsis-causing molecules. And since they are covered in actual macrophage cell membranes, they can circulate in the bloodstream without being evicted. New research using this approach published in PNAS has improved survival rates in mice with sepsis. This is just one example of the cell membrane cloaking technology developed in the lab of nanoengineering professor Liangfang Zhang. His group develops new nanomedicine therapies by disguising nanoparticles as the body’s own cells. Previous examples include red blood cell nanosponges to combat and prevent MRSA infections; and nanoparticles cloaked in platelet cell membranes to repair wounded blood vessels.



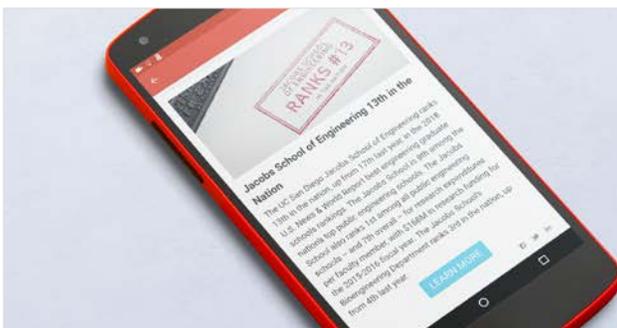
Learn more: bit.ly/NanospongeSepsis

People feel the single-molecule difference



Humans can feel the difference between surfaces that differ by just a single layer of molecules, according to research from nanoengineers and psychologists at UC San Diego. When the researchers kept all large-scale effects equal and changed only the topmost layer of molecules, humans could still detect the difference using their sense of touch. This work could be useful for developing electronic skin, prosthetics that can feel, advanced haptic technology for virtual and augmented reality and more. “This is the greatest tactile sensitivity that has ever been shown in humans,” said Darren Lipomi, a professor of nanoengineering and member of the Center for Wearable Sensors at the UC San Diego Jacobs School of Engineering, who led the interdisciplinary project with V. S. Ramachandran, who is director of the Center for Brain and Cognition and a UC San Diego psychology professor.

Learn more: bit.ly/TouchSurfaces



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