UC San Diego JACOBS SCHOOL OF ENGINEERING

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\$14M from NIH to build digital maps of brain, organs

With \$14 million in NIH grants, bioengineers are now building 3D "reference maps" at the level of single cells for the human brain and for the respiratory and urinary systems. "If a patient has Alzheimer's or chronic kidney disease, we can zoom in and examine what's happening at the level of individual cells and compare it to the reference map of a normal brain or kidney," said project lead Kun Zhang, professor and department chair of bioengineering. "This could help us identify biomarkers and better clinical decisions on what treatments to use." Bioengineering at the Jacobs School ranks #2 in the nation according to the latest US News grad program rankings.



Learn more: bit.ly/SingleCellMaps



Steerable catheter to treat brain aneurysms

Mechanical engineers are developing a tiny, steerable catheter designed to remotely navigate the brain's arteries to diagnose and treat un-ruptured brain aneurysms. The technology took second place at the 2018 Collegiate Inventors Competition. The project is being led by Ph.D. student Gopesh Tilvawala, who is part of professor James Friend's lab in the Department of Mechanical and Aerospace Engineering. The team has collaborated with UC San Diego researchers in neurosurgery, radiology, and vascular surgery. The steerable catheter could also be used in the heart and urinary tract and is a step toward next-generation small and dexterous surgical tools with extreme maneuverability.

Learn more: bit.ly/Gopesh

3D bioprinting made easy

Bioengineers are working to make it easier for scientists to make 3D models of whatever human tissues they're studying. The goal is to make easy-to-grow human organ models that can be studied outside the body or used for pharmaceutical drug screening. The bioengineering team led by professor Prashant Mali created blood vessel networks capable of keeping a breast cancer tumor alive outside the body, and a model of a vascularized human gut. "You don't need anything complicated to adopt this into your lab," said Mali. This work is published in *Advanced Healthcare Materials*.



Learn more: bit.ly/MaliBioprinting



Four Jacobs School professors named AAAS Fellows

The four Jacobs School professors named AAAS Fellows this year are: **Farhat Beg** for high energy density science **Priorb** Curte for systems and bordware software as design, and research

Rajesh Gupta for systems and hardware-software co-design, and research administration Pavel Pevzner for computational molecular biology; leadership in bioinformatics education Liangfang Zhang for therapeutic nanoparticles that evade immune attack.

Computer scientists discover new hacking techniques

Security researchers at UC San Diego and Stanford discovered four new ways to expose Internet users' browsing histories. These techniques could be used by hackers to learn which websites users have visited as they surf the web. "My hope is that the severity of some of our published attacks will push browser vendors to revisit how they handle history data, and I'm happy to see folks from Mozilla, Google, and the broader World Wide Web Consortium (W3C) community already engage in this," said Deian Stefan, a computer science professor at the Jacobs School and the study's senior author.

Learn more: bit.ly/BrowsingHistory



Influence of engineering maker studio grows

The EnVision Arts and Engineering Maker Studio at the Jacobs School runs a summer program that gives engineering students opportunities to work in multidisciplinary teams on real projects. Last summer, the team designed and built an interactive exhibit that is now installed in the Birch Aquarium at Scripps Institution of Oceanography here at UC San Diego. The exhibit allows people to interact with sounds made by five different marine animals and explore the problem of marine noise pollution at the same time. The EnVision Maker Studio, which is a collaboration with visual arts at UC San Diego, is part of the Jacobs School's Experience Engineering Initiative, which has vastly expanded hands-on engineering courses across the Jacobs School.

Learn more: bit.ly/BirchExhibit



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