

## 2019 Snapshot: We make bold possible

At the Jacobs School of Engineering, we take on the tough challenges no lab, discipline, or company can solve alone. To do this, we collaborate across disciplines within the Jacobs School and throughout UC San Diego's \$1.2 Billion research enterprise. And when we partner with industry, we actually listen, which enables us to address the toughest shared challenges. At the same time, we are transforming engineering education, at scale. In all we do, we return to our guiding principle: engineering for the public good. Get a quick overview of the Jacobs School and stats on our six academic departments in our 2019 Snapshot.



Learn more: [bit.ly/2019Snapshot](http://bit.ly/2019Snapshot)



## 2018 research highlights

As we begin to tackle 2019's challenges, we're also looking back on a few 2018 research highlights. The Jacobs School's professors are ranked #1 in the nation for research expenditures per faculty member, among U.S. public engineering schools. All our efforts tie back to a singular principle: engineering for the public good. We couldn't do this without the incredible support, hard work, guidance and friendship of so many people here at the Jacobs School, across UC San Diego, in the local community, and far beyond San Diego.

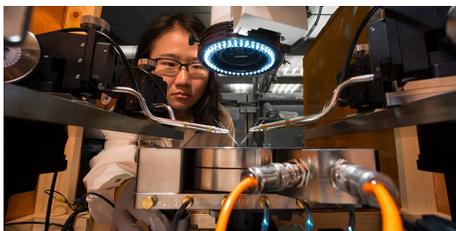
Learn more: [bit.ly/2018ResearchWins](http://bit.ly/2018ResearchWins)

## A robot that can sense plankton

Oceanographers and engineers from UC San Diego collaborated to modify a common physical oceanography instrument to be able to image zooplankton as it glides through the ocean. The robot, dubbed Zooglider, can acquire images of zooplankton to depths of 400 meters or more as it channels seawater into an on-board sampling tunnel. The new instrument represents a breakthrough in enabling observations of microscopic life in its habitat and providing information about that life in spatial context. Jacobs School computer scientists are now creating methods for Zooglider's image data to be analyzed using machine learning.



Learn more: [bit.ly/Zooglider](http://bit.ly/Zooglider)



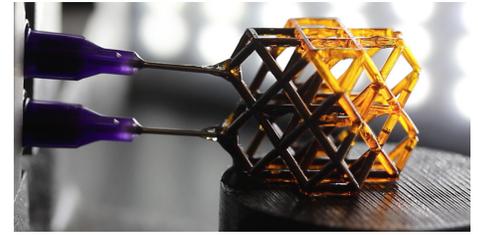
## Making neural networks less power hungry

Electrical engineers developed a neuro-inspired hardware-software co-design approach aimed at making neural network training more energy-efficient and faster. Their work, published in Nature Communications, could make it possible to train neural networks on low-power devices such as smartphones, laptops and embedded devices. "If we benchmark the new hardware to other similar memory technologies, we estimate our device can cut energy consumption 10 to 100 times, then our algorithm co-design cuts that by another 10. Overall, we can expect a gain of a hundred to a thousand fold in terms of energy consumption following our approach," said electrical engineer Duygu Kuzum. She is a professor in the Center for Machine-Integrated Computing and Security at the Jacobs School.

Learn more: [bit.ly/KuzumLabNeuralNets](http://bit.ly/KuzumLabNeuralNets)

## 3D-printed metamaterials that change mechanical properties

Researchers have developed an entirely new class of metamaterials that can nearly instantly respond and stiffen 3D printed structures when exposed to a magnetic field. The advance could be applied to next-generation helmets and wearable armor that stiffen instantaneously when a threat is detected. Next steps include developing a single-phase material, instead of having a liquid embedded in solid, and higher performance-to-weight ratios. The research team hails from Lawrence Livermore National Laboratory and the structural engineering department at the Jacobs School.



Learn more: [bit.ly/3Dmetamaterials](http://bit.ly/3Dmetamaterials)



## Indigo art exhibit brings engineers, artists together

The Jacobs School of Engineering collaborated with the Division of Arts and Humanities to host Indigo, an interactive, interdisciplinary art exhibit. Indigo celebrates a diversity of artistic practices happening at UC San Diego, and engages audiences with art outside of a traditional gallery setting. This exhibition features pieces created by students, faculty, and alumni from both engineering and artistic fields of study, and is open to the public through the end of January.

Learn more: [bit.ly/IndigoExhibit](http://bit.ly/IndigoExhibit)

## Undergraduates trailblaze in liquid biopsy arena

Eleven UC San Diego undergraduate students set out to solve a problem that billion dollar companies and academic institutions alike are working on: finding an accurate way to detect cancer using a drop of blood instead of the traditional tissue biopsy approach. Their diagnostic platform, called Epinoma, earned them second place out of 250 teams from around the world at the International Genetically Engineered Machine competition. The team is led by bioengineering undergraduate Varun Govil, who is a Jacobs School Scholar – the Jacobs School's prestigious full-ride scholarship program.



Learn more: [bit.ly/Epinoma](http://bit.ly/Epinoma)

**FACTS AND FIGURES: #2 IN THE NATION**

**THE DEPARTMENT OF BIOENGINEERING  
RANKS #2 IN THE NATION**

**AND HAS RANKED IN THE TOP FOUR  
EVERY YEAR FOR MORE THAN A DECADE.**

\*US NEWS, MARCH 2018



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