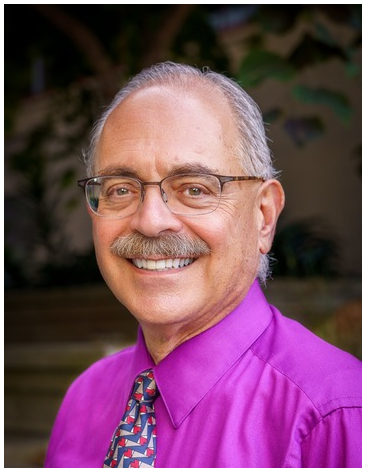
UC San Diego
JACOBS SCHOOL OF ENGINEERING

NEWS
October 2023

Enterprise-scale Innovation



Here at the UC San Diego Jacobs School of Engineering, we hired 15 new faculty in Fall 2023 – and more than 160 faculty over the last ten years. That's a lot of world-class engineering and computer science innovators to join a school in the course of a decade! Almost exactly one year ago, we celebrated our first named academic department both here at the Jacobs School and on the main UC San Diego campus: the Shu Chien-Gene Lay Department of Bioengineering – our bioengineering community is truly a marvel. As I highlighted last month, we are celebrating the 25th anniversary of the naming of our Irwin and Joan Jacobs School of Engineering. Meanwhile, Franklin Antonio Hall is fully activated – the circulation of people and ideas is remarkable. We have strategically grown our masters programs; risen in many different rankings; expanded our experiential-education capacity for undergraduates; and logged more research expenditures than any engineering school in California or on the West Coast. Our industry engagement efforts and student centers are national models. I could go on. But I share this extremely non-comprehensive avalanche of good news to highlight that the Jacobs School has arrived – and that we are rising still.

So, what's the roadmap for our future? After spending ten years strengthening our Jacobs School and refining all the machinery we use to be successful, we are set for a deliberate, sustained, continuous rise in positive impact – both here in Southern California and on the national stage. We have reached the point where we can drive innovation ecosystems for specific enterprises at scale.

Biomanufacturing, fusion engineering, and microelectronics production for 5G/6G (including new funding from the Chips and Science Act of 2022) are three examples of Grand Initiatives at the Jacobs School where we are building enterprise-scale innovation ecosystems that are poised to have direct positive impact.

We have also put together a process to ensure a consistent stream of big, grassroots ideas coming from our academic departments. This is about surfacing public-interest research efforts that could become transformative with the right support – likely in collaboration with an industry consortium. I'm calling this the Leviathan Initiative. More to come on this exciting project.

At the same time, I am working on a new effort to facilitate transformative research from the other direction by accelerating the formation of industry consortia. Proactive collaboration and leadership driven from the industry side is frequently a critical factor for empowering engineering schools to solve emergin enterprise-scale challenges that are too big for any one discipline or company to tackle alone.

With the Leviathans, we have a grassroots process for surfacing emerging research opportunities from our departments. With the consortia project, we are building an industry-driven process for surfacing research needs. I believe the Jacobs School has an important role to play in connecting these two processes. In fact, we intend to test the premise that these two systems can not only operate in parallel but be linked together.

In closing, while remaining steadfast in our missions for education, research and innovation for the public good, we are also part of a group of engineering schools that has stepped up in terms of positive national impact driven by engineering and computer science innovation. I believe this is what the country needs. And we will do it at the enterprise scale, in order to have the greatest positive impact possible.

As always, I can be reached at DeanPisano@ucsd.edu.

Sincerely,

Al
Albert ("Al") P. Pisano, Dean
UC San Diego Jacobs School of Engineering

Fifteen Faculty Join the Jacobs School in Fall 2023

These outstanding researchers and educators join the more than 160 faculty members the school has hired in the past 10 years. “The Jacobs School is surging forward,” said Dean Albert P. Pisano. “We may have arrived, but we are not resting on our laurels. We are rising still.”

Read More

Bioengineering, Computer Science Undergrad Programs Rank Top 10

Several undergraduate programs at the Jacobs School were ranked among the top in the country– including 3 in the top 10– in the U.S News 2024 Best Colleges ranking. The biocomputing, bioinformatics, biotechnology program was ranked 2nd in the nation. The mobile and web applications undergraduate specialty within the Department of Computer Science and Engineering was ranked 5th. The bioengineering and biomedical undergraduate program was ranked 8th. UC San Diego as a whole advanced two spots to become the 6th best public university in the country.

Read More

3D-Printed ‘Living Material’ Could Clean Up Contaminated Water

Dubbed an “engineered living material,” the 3D-printed structure is made of a seaweed-based polymer combined with bacteria that have been genetically engineered to produce an enzyme that transforms various organic pollutants into benign molecules. The work was a collaboration among engineers, materials scientists and biologists at the UC San Diego Materials Research Science and Engineering Center (MRSEC). The research team described the sustainable, eco-friendly decontaminating material in a paper published in *Nature Communications*. Watch the video.

Read More

Turning Earbuds into EEG and Lactate Sensing Devices

A pair of earbuds can be turned into a tool to record the electrical activity of the brain as well as levels of lactate in the body with the addition of two flexible sensors screen-printed onto a stamp-like flexible surface. The sensors can communicate with the earbuds, which then wirelessly transmit the data gathered for visualization and further analysis, either on a smartphone or a laptop. The data can be used for long-term health monitoring and to detect long-term neuro-degenerative conditions. The work, published in *Nature Biomedical Engineering*, is a collaboration between lead researchers at the Jacobs School’s Center for Wearable Sensors. Watch the video and read coverage in WebMD.

Read More

High-profile Domains Are Vulnerable to Spoofing via Email Forwarding

Computer scientists at UC San Diego found that sending an email with a forged address is easier than previously thought, due to flaws in the process that allows email forwarding. The issues the researchers uncovered have a broad impact, affecting the integrity of email sent from tens of thousands of domains, including those representing organizations in the U.S. government – such as the majority of U.S. cabinet email domains as well as security agencies.

Read More

A New Ally in Pest Control: Nanoparticles Made from Plant Viruses

Nanoengineers at the Jacobs School have developed nanoparticles, fashioned from plant viruses, that can deliver pesticide molecules to soil depths that were previously unreachable. This advance could potentially help farmers effectively combat parasitic nematodes that plague

the root zones of crops, all while minimizing costs, pesticide use and environmental toxicity. Stemming from the Center for Nano-ImmunoEngineering, the work is detailed in a paper published in *Nano Letters*.

Read More

Jacobs School Dean Emeritus Awarded Top NAE honor

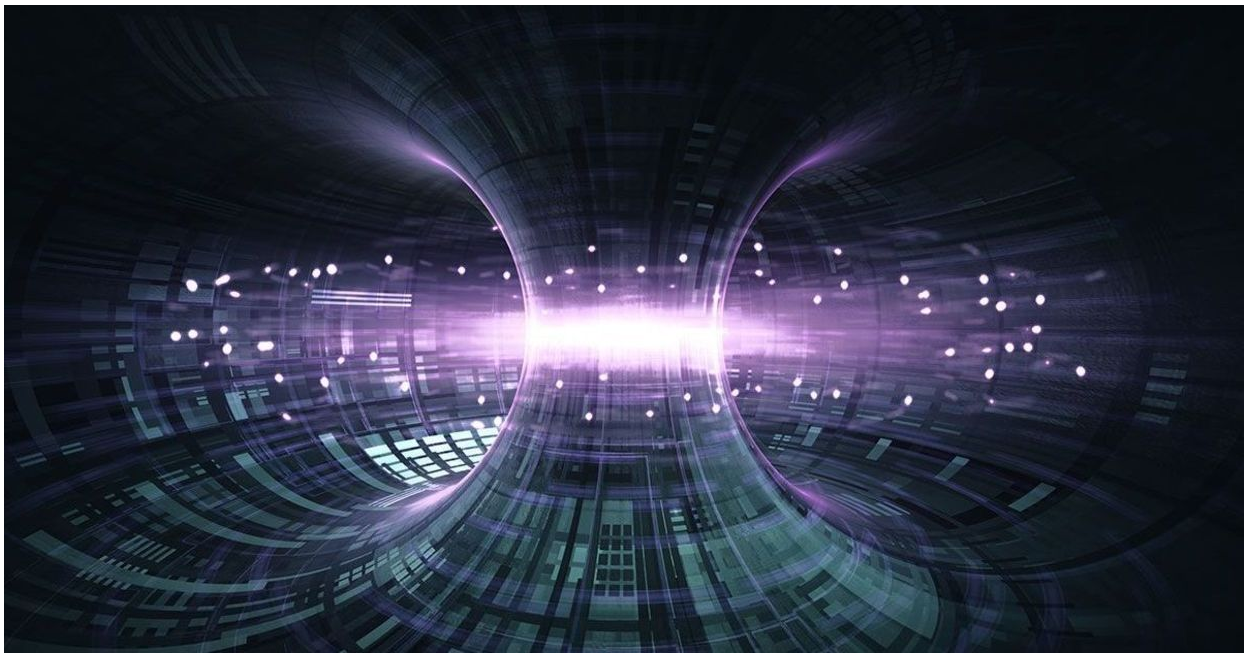
Robert “Bob” Conn, dean emeritus of the Jacobs School of Engineering, has been selected to receive one of the oldest and most prestigious National Academy of Engineering (NAE) awards, the Simon Ramo Founders Award for 2023. Conn is being recognized for shaping national science and technology policy through leadership in academia, business, and philanthropy, and for seminal contributions to fusion engineering. He is the fourth Jacobs School recipient in 25 years, joining Y.C. Fung, Shu Chien, and Stanford 'Sol' Penner as Founders Award recipients.

Read More

UC San Diego Awarded $9.5M to Enhance Cybersecurity in Health Care

Researchers at UC San Diego have been awarded $9.5M from the Advanced Research Projects Agency for Health (ARPA-H) innovative research that aims to protect the United States health care system against hostile cyber threats. The contract award will help the researchers develop better ways to prevent and mitigate ransomware attacks, a type of cyberattack in which hackers attempt to extort money from organizations by blocking access to essential computer systems.

Read More



UC San Diego Joins Fusion Research Team with $7.4M from DOE

UC San Diego joins General Atomics, Hewlett Packard Enterprise and Sapientai to support high-priority fusion research funded by a $7.4M award from the Department of Energy (DOE). The team will develop a Fusion Data Platform to provide access to high-quality fusion data for the

efficient creation of reproducible artificial intelligence and machine learning models. A key goal is to support the design and operation of a broad range of fusion pilot plant designs and plasma configurations within a decadal timescale. The UC San Diego researchers hail from the San Diego Supercomputer Center and the computer science and engineering department.

Read More

Newsletter editor, Daniel Kane: dbkane@ucsd.edu