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Cameron Walker

New UCSB biofoundry to accelerate discoveries in biotechnology and biomanufacturing

A new research facility at UC Santa Barbara is set to transform the pace and scope of biotechnology. The BioFoundry for Extreme and Exceptional Fungi, Archaea and Bacteria (ExFAB), supported by a six-year, \$22 million dollar grant from the National Science Foundation (NSF), will give scientists unprecedented tools to study previously unexamined microbes. Their discoveries could fuel breakthroughs in biomanufacturing, climate solutions and the development of novel products, underscoring UCSB's longtime leadership in translating research into real-world impact.

Plans for ExFAB were [first announced in 2024](#). A grand opening was held in September 2025.

"ExFAB is our first endeavor that bridges marine sciences, bioengineering and biotechnology with a focus on what is important for the future economy, and the climate of our state and our country," said Rachel Segalman, UCSB's vice chancellor for research. "It is focused not just on the innovation of what kind of microorganisms could make us new products and what are those new products useful for, but also on how we develop the next generation of researchers and support entrepreneurship."

UCSB has a long history of turning research into technologies that impact daily life, noted Umesh Mishra, dean of the Robert Mehrabian College of Engineering.

Referring to materials professor Shuji Nakamura's work on LED lighting, which earned him the 2014 Nobel Prize in Physics, Mishra said: "To me, getting something in the hands of a human being is as important as writing a paper in Nature. ExFAB represents everything that's good about UCSB."

Steve Peretti, NSF program director for cellular and biochemical engineering, spoke about the role of biofoundries in advancing NSF priorities, from creating laboratories that can connect through the cloud to preparing novel products for the market and expanding education to train both industrial and academic workforces.

"If you look at all the things that (ExFAB director) Michelle O'Malley and her team have been doing," he said, "one of the reasons we were wowed by their proposal — and continue to be impressed with their progress — is that they are doing all these things, and doing them all well."

Peretti highlighted UCSB's collaboration with institutions such as UC Riverside and Cal Poly Pomona as a strength of its research program and a foundation for the next generation of scientists. "The collaboration with the Cal State system is incredible, and I think it's going to lead to the kind of workforce development that we're really excited about," he said.

ExFAB's state-of-the-art automation and robotics are designed to enhance research by allowing scientists at all levels to focus on what they do best: designing experiments and interpreting results. "The BioFoundry is really meant to speed up the pace of biology," said O'Malley, a professor of chemical engineering and bioengineering. "We always need that human in the loop — and all the students and PIs here, that human is you. Our goal is to build a workforce fluent in these automated robotic pipelines, because that knowledge is what drives innovation."

UCSB earth science professor and ExFab co-PI David Valentine discussed how his research aligns with the new facility. Valentine studies the interaction between microbes and chemicals in the ocean, including the effect of offshore DDT pollution — work that appears in the documentary "Out of Plain Sight." On the sea floor, he said, "There are microbes that have been exposed to these chemicals for 80 years. They've been metabolizing it. They figured out ways to break down these chlorinated compounds slowly."

With ExFAB, Valentine and other researchers can investigate how those microbes respond to pollution and, potentially, use what they learn to advance remediation. “We’ve got the ability to engineer capabilities that these organisms have evolved over time — to study them, understand them, and perhaps even apply nature’s remedies,” he said.

The facility’s automated chamber, located on the second floor of Elings Hall, houses robotic pipelines and advanced instrumentation that accelerate the pace of experimentation and discovery.

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