

UC SANTA BARBARA

THE *Current*

August 25, 2025

Seren Snow

NSF renews \$19.8M for UCSB and UCLA to lead U.S. innovation in AI-driven biomaterials

The U.S. National Science Foundation has renewed funding for BioPACIFIC MIP — the Biomaterials, Polymers and Advanced Constructs from Integrated Chemistry Materials Innovation Platform — a collaboration between UC Santa Barbara and UCLA that provides a unique scientific ecosystem for the United States. This \$19.8 million award empowers BioPACIFIC MIP to continue advancing the frontier of biobased materials, uniting synthetic biology, chemistry, automation and artificial intelligence to reshape how materials are discovered, designed and deployed.

[Originally launched in 2020](#) as one of just four MIPs nationwide, [BioPACIFIC MIP](#) is entering its second and final five-year phase. The renewed funding underscores its national role as a user facility and central hub for accelerating materials innovation, broadening its impact on research, workforce training and the development of real-world solutions to pressing challenges.

“Renewing BioPACIFIC MIP is essential to keeping California and the U.S. at the forefront of sustainable materials innovation,” said Craig Hawker, co-principal investigator and director of the California NanoSystems Institute (CNSI) at UCSB. “This program turns scientific breakthroughs into real-world solutions that benefit the U.S. economy while training the next generation workforce.”

A national platform for next-generation biomaterials

BioPACIFIC MIP accelerates the development of functional materials from biological building blocks through five integrated goals: providing nationwide access to advanced instrumentation, developing high-performance bio-based materials, bridging molecular and macroscopic understanding of structure and function, leveraging AI and automation to speed discovery, and training an interdisciplinary workforce for emerging industries.

Autonomous experimentation: a new era in materials research

A major emphasis of the NSF BioPACIFIC MIP's second phase is the integration of robotics and artificial intelligence to enable autonomous experimentation. This transformation is designed to vastly accelerate discovery, eliminate bottlenecks and move promising materials more quickly from the lab to real-world applications.

"This award reflects the remarkable efforts of our project scientists, faculty, students and MIP community, enabling us to advance biomaterials innovation and usher polymer synthesis into the era of robotic platforms," said Javier Read de Alaniz, UCSB professor of chemistry and biochemistry and BioPACIFIC MIP co-director and PI.

"Looking ahead, we are energized to expand BioPACIFIC MIP's impact, accelerating high-throughput experimentation and leaving a lasting legacy of training a generation of scientists at the forefront of materials science."

Unlocking innovation through collaboration

Since opening to users in 2021, BioPACIFIC MIP has supported approximately 130 research projects across 22 states — including many from institutions without prior NSF platform access — demonstrating its broad national impact. For example, an assistant professor at University of Southern Mississippi was not only able to launch his scientific career, but also successfully applied for a large piece of equipment for Southern Miss as a result of the expertise, facilities and mentorship received at BioPACIFIC MIP.

"BioPACIFIC MIP is a user facility open to researchers across the U.S.," said Read de Alaniz. "Our centralized, state-of-the-art facility and in-house expertise allow users to lead their own research programs — bringing together R1 institutions, primarily

undergraduate institutions, and non-R1s alike in pursuit of next-generation materials.”

This infrastructure enables cross-pollination of research ideas, accelerating breakthroughs in fields ranging from degradable plastics to advanced microelectronics and sequence-defined polymers.

Impactful research, powerful tools

BioPACIFIC MIP researchers have pioneered degradable adhesives for packaging, engineered advanced materials for microelectronics, and partnered with BASF to develop biodegradable plastics. The facility also fosters entrepreneurship, supporting startups like Praio, FLO Materials, and Saku Biosciences that bring its innovations to market. By linking fundamental research with industry needs, BioPACIFIC MIP is positioning Southern California as a hub for biomaterials innovation and lowering barriers to accelerate commercial development.

“The NSF BioPACIFIC MIP has provided an ecosystem that is unique in the United States,” said UCLA’s Heather Maynard, Dr. Myung Ki Hong Endowed Chair in Polymer Science, co-director of the MIP, co-PI and associate director of CNSI.

“Users from across the country can utilize one-of-a-kind equipment and take advantage of extraordinary expertise in an environment that greatly accelerates research in polymers and biomaterials,” Maynard added. “This benefits our country by providing paradigm shifts in how new materials are discovered and characterized. I am thrilled that the NSF has enabled us to continue this work.”

Training the future workforce

A key component of BioPACIFIC MIP’s mission is workforce development. More than 100 graduate students and postdoctoral fellows have already benefited from interdisciplinary training in automated synthesis, data-driven experimentation and synthetic biology.

“Because we combine interdisciplinary research with high-throughput experimentation, we’re training students in a way that aligns with industry needs,” said Read de Alaniz. “Our ecosystem equips them with hands-on experience in robotics, AI and polymeric materials synthesis — giving them a true competitive edge.”

“As a National User Facility, BioPACIFIC MIP is providing critical national infrastructure for all researchers to bridge biological synthesis with the making of new, functional materials,” said Rachel A. Segalman, vice chancellor for research at UCSB. “This is incredibly important not just for positioning UCSB at the forefront of this important field, but also training a broad workforce and providing resources for a research community far beyond our campus.”

Powering discovery with digital infrastructure

BioPACIFIC MIP has also built a robust digital ecosystem, linking electronic lab notebooks, data sharing and AI-powered analytics into a cohesive infrastructure.

“This digital backbone allows us to capture successful and unsuccessful experiments alike,” Read de Alaniz said. “Now, we can build high-quality datasets to fuel machine learning models that will dramatically improve the speed and success of materials discovery.”

The next five years will see further investment in this digital infrastructure, a critical step toward fully autonomous discovery workflows envisioned by the Materials Genome Initiative — a federal effort to shorten the timeline for developing advanced materials.

“This renewal affirms the critical role BioPACIFIC MIP plays in advancing scalable platforms for bio-derived and bio-inspired materials,” said Umesh Mishra, dean of The Robert Mehrabian College of Engineering at UCSB. “The collaborative model between UCSB and UCLA continues to enable transformative research at the intersection of biology, chemistry and materials science. I commend our faculty, researchers and staff for their vision and leadership in building the materials infrastructure of the future and driving innovation with global impact.”

Yi Tang, professor of chemical engineering and chemistry at UCLA and co-PI, added that the continued funding “positions CNSI at the forefront of advancing the next generation of biomanufacturing and AI-programmable laboratories.”

The BioPACIFIC MIP renewal marks a pivotal moment for the platform. As it expands AI-driven experimentation, deepens its user community and trains the next generation of interdisciplinary scientists, it is uniquely positioned to help the U.S. remain a leader in new materials and advanced manufacturing.

Tags

[Artificial Intelligence](#)

[Health and Medicine](#)

Media Contact

Debra Herrick

Associate Editorial Director

(805) 893-2191

debraherrick@ucsb.edu

About UC Santa Barbara

The University of California, Santa Barbara is a leading research institution that also provides a comprehensive liberal arts learning experience. Our academic community of faculty, students, and staff is characterized by a culture of interdisciplinary collaboration that is responsive to the needs of our multicultural and global society. All of this takes place within a living and learning environment like no other, as we draw inspiration from the beauty and resources of our extraordinary location at the edge of the Pacific Ocean.