UC SANTA BARBARA

THE Current

August 25, 2026
Cameron Walker

UCSB launches prototyping hub for packaging microchips and photonics

Each year, more than 500 researchers, industry scientists and students use UC Santa Barbara's open-access Nanofabrication Facility, known as the Nanofab, to design and build microchips for applications ranging from quantum communications to biomaterials that could help repair bone. Now, a new UCSB facility will help turn those chips into working prototypes, accelerating innovation while expanding workforce opportunities and helping attract companies and high-paying jobs to the region.

The Protofab, located at the OASIS research and development hub in Goleta, is opening a range of equipment for research use this month, including tools for automated wire bonding, plasma cleaning and 3D package inspection. Additional equipment for microoptics and photonics packaging will be available soon.

With more than 4,000 square feet of space, Protofab enables users to package their chips and turn them into prototypes — a step long considered a bottleneck in research and development, said Brian Thibeault, Nanofab's technical and operational director. "We believe this facility will really expand innovation."

"Protofab bridges a critical gap faced by both startups and established players in research and industry," said Umesh Mishra, dean of The Robert Mehrabian College of Engineering. "The ability to package emerging technology will broaden the positive impact of OASIS, help drive economic growth in our region, and enable the

process of turning innovative new tools into real-world solutions at speed and at affordable cost.”

Once researchers build a microchip at the Nanofab, they need to package their microchips to incorporate them into testable systems. For example, UCSB electrical and computer engineering professor Daniel Blumenthal has scaled large lasers and optical equipment down to the size of a chip, and has spent years building his group’s in-house photonics packaging capability to couple these chips with the lasers and housing to make them useful, robust and portable devices.

The startups and companies using the Nanofab to make advanced electronics also need to be able to package their chips both to show investors a finished product, and then to make their product available and useful at a larger scale. Smaller businesses, in particular, may be at the mercy of outside vendors to do the packaging, meaning that they have little control over the quality and timing of this often-expensive process.

With the new prototyping facility, Thibeault said, “this process is open and available for people to come in and use their own hands, on their own time schedule, to get trained on how to do packaging and advanced integration, with expert support and guidance.” This spring, a direct fiber-optic network connection linked the prototyping facility with the Nanofab, shrinking the two-mile distance between the facilities and making processes like equipment signup identical, he added. “Our prototyping facility is coupled and closely connected with the Nanofab, so that the researchers and companies that build advanced electronics on campus will have a seamless experience as they move into packaging.”

Led by facility manager Arin Abed, Protofab has installed electrostatic dissipating flooring and a Class 10,000 modular cleanroom for the packaging lab to protect sensitive components and parts. The team has also added additional equipment, such as an automated wire bonder with integrated pull/shear test; epoxy dispense/cure and plasma clean stations; and a digital confocal microscope that allows users to perform high-resolution optical inspection, and to measure, characterize, and document their micro- and opto-electronic devices and components.

Protofab also has plans to install a high-precision motorized/programmable die bonder that places components with sub-micron accuracy, and an automatic fiber-

alignment, bonding and test system for photonic integrated circuits.

Another major addition will be a 3D rapid nanoprinting system based on two-photon photolithography system for photonic wirebonds and optical microlens packaging techniques.

The tool was secured with the help of a $1.15 million National Science Foundation grant awarded to UCSB professor of electrical and computer engineering Galan Moody and four co-PIs — Marley Dewey (Bioengineering), Andrew Jayich (Physics), Sumita Pennathur (Mechanical Engineering), and Andrea Young (Physics). With this equipment, Moody and his colleagues will be able to conduct research in quantum photonics, biomaterials and fluid analysis, among other pursuits. Thibeault noted that, with the new nanoprinting system, “you can quite literally connect two microchips with light.”

Protofab received its initial funding through Uplift Central Coast’s Catalyst Program, a regional economic development grant. The prototyping facility is one of many areas that the university is readying as part of the OASIS facility, which will also have wet lab space for incubator companies and other resources that small companies can use as part of their research endeavors. This public-private partnership is what has allowed the Nanofab to be sustainable, Thibeault said. “This model is becoming more and more important at the university.”

Tags
Innovation & Entrepreneurship

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.