

USC's Michelson Hall, a Hub for Biotech Research, is Ready to Change the World

The largest building on the University Park Campus brings together top engineers and scientists in shared spaces designed to encourage collaborative research

By Emily Gersema, USC News
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Ariel view of Michelson Hall



Interior

A simple blood test could tell patients whether they have cancer. A smartphone app could predict heart failure before it strikes. A map of developing memory in the brain could be used by doctors to solve issues with traumatic brain injuries or neurological disease.

These are some of the research efforts underway by scientists and engineers at the new USC Michelson Center for Convergent Bioscience. More than two dozen researchers are unraveling the mysteries of cancer, exploring the development of the human brain and advancing scientific understanding of the human body and its interactions with a range of diseases on a cellular level. Michelson Center researchers aim to speed the development of new drug therapies, high-tech diagnostics and biomedical devices from the bench to the bedside.

On Wednesday, USC will open Michelson Hall, the new hub for this groundbreaking research endeavor as a cornerstone for biotech in Los Angeles. The grand opening of the \$185 million building caps nearly

seven years of planning and design, including three years of construction. All that had once existed only in blueprints is now a reality, thanks to a generous \$50 million gift from retired orthopedic spinal surgeon Gary K. Michelson and his wife, Alya Michelson.

"It was a privilege for Alya and me to have been able to have been a part in the creation of this world-class convergent bioscience research center," Michelson said.

In addition to impressive curriculum vitae and a long list of publications, many of the Michelson Center researchers boast a portfolio of patents and successful startup launches. Entrepreneurs and inventors, they appear to be cut from the same cloth as Michelson himself, who holds more than 950 patents, issued and pending. His inventions have revolutionized spinal surgeries, making them safer for patients by reducing blood loss.

The Michelson Center's diverse network of premier scientists and engineers represent a long list of research fields ranging from biological science and medicine to

physics and engineering. They hail from the USC Dornsife College of Letters, Arts and Sciences, the USC Viterbi School of Engineering and the Keck School of Medicine of USC, and will work to solve some of the greatest intractable problems of the 21st century in biomedical science.

"The scientists and researchers at Michelson Center are in many ways driven by personal passion, and recognize that curiosity-based science is one of the greatest paths toward revolutionizing how we diagnose and treat cancer, cardiovascular disease and neurological issues," USC Provost Michael Quick said. "At Michelson, we aim to deliver meaningful solutions to address disease, solve the challenges that impede care and expand our scientific knowledge for the betterment of health across the lifespan."

The new building has been a collaboration from the start. The scientists and engineers who will be part of Michelson Center all had a hand in designing the building's spaces and selecting many of its assets and furnishings.

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Michelson Hall will house the new USC Michelson Center for Convergent Bioscience

Big gigs for big digs

The four-story building features the fastest fiber connectivity on campus — 100 gigabit — as well as wet labs, research centers, a fabrication lab, offices and conference rooms. The building also features a cleanroom — a dust-free environment for testing products such as nanoscale chips and biomedical devices.

“It is absolutely the most complex research building that we have ever done,” said Joe R. Back, associate senior vice president for USC Campus Development and Facilities. “All the mechanical, electrical and plumbing systems that are required for lab work that are not required for other buildings are densely packed into the walls of that building.

“Michelson Hall was planned down to the inch, including what pipe goes next to another pipe.”

The cleanroom was an intensive project. USC officials said they had to conduct soil testing to determine the best locale for the cleanroom on the site to insulate it from the vibrations of the nearby Metro Expo Line light rail. Other measures taken to protect the lab included a 3-foot concrete slab for the building's base. The ductwork alone for Michelson Hall would span 6 miles if laid from end to end.

More than 275 construction workers and tradesmen spent a combined 699,700 hours to build Michelson Hall. Designed by HOK and erected by DPR Construction, the work involved a half dozen engineering firms and subcontractors: John A. Martin and Associates based in Los Angeles, Vanderweil Engineers, ACCO Engineered Solutions, Murray Plumbing, CSI Electric, Masonry Concepts and Largo Concrete. Abbie Gregg Inc., a consulting firm based

in Tempe, Ariz., oversaw the design and construction of the cleanroom and the spaces that will house the large electron microscopes.

Among Michelson Hall's distinctions is a series of looming arches and peaked windows — signature features of the collegiate gothic architecture style that is reminiscent of British and New England universities. It is in the same vein of other USC buildings at the University Park Campus, such as USC Village, which opened in August, and Wallis Annenberg Hall, which opened in 2014.

Tailored for science

Beyond the more than 250,000 handset bricks that wrap Michelson Hall is a modern interior that could be mistaken for a Silicon Valley work environment. A main highlight of the building is the “living

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room” — an open lounge-like space that has various pods where researchers, if they run into each other at the espresso machine, can sketch their visions and scribble hypotheses on touchscreens, then save their work to the cloud.

“I call it a collision space,” said Alton Parks, the Michelson Hall architect who noted that even the bar stools in the living room are designed to prop researchers and visitors at eye-level with anyone passing by. “This is what will draw people out of their silos.”

For Michelson Hall, USC had consulted Los Angeles-area designer Richard Holbrook, who had spent two years touring innovative work spaces around the world, visiting cities such as Hong Kong and Kuala Lumpur, Parks said.

Many of the engineers and scientists for Michelson Center have developed new products, including new drugs or biomedical devices, and have a track record of launching startup companies.

The center is greater than the sum of its parts. “This is meant to create a sea-change of collaborative scientific research across the university,” said Steve Kay, director of convergent biosciences at USC.

The leading edge of research

USC is not the first institution to launch a convergent bioscience institution, but it may well be the second. A similar center, the Whitehead Institute, exists at the Massachusetts Institute of Technology. Other universities across the country have established centers and institutes for biotechnology, but few are so focused on the convergence of research in engineering, the physical sciences and life sciences.

Kay said USC created Michelson Center through careful deliberation.

“At USC, we are doing this with precision and are bringing together the skill sets that will solve unmet medical needs,” Kay said. “Even well before the building is open, some of our biggest successes are certainly coming out in the areas of cancer, personalized medicine and in drug discovery,” said Kay, Provost Professor of Neurology, Biomedical Engineering and Biological Sciences.

Some of the scientists tapped to be part of the Michelson Center were already at the university when leaders began to discuss creating a center for bioscience. Others, like Raymond Stevens PhD '88, came to USC before the spade broke ground, excited about the promise of bridging the divides that have traditionally separated the disciplines.

Stevens, a Provost Professor of Chemistry and Molecular Biology, moved to USC in 2014 from The Scripps Research Institute in San Diego. As an alum, it was a homecoming for Stevens, who said he has been looking forward to moving into his customized lab at Michelson Hall.

“USC made it easy to come here,” said Stevens, whose breakthroughs in therapeutic molecules have led to the development of Tamiflu, the antiviral used to treat influenza, and treatments for neurological diseases such as multiple sclerosis. “The potential for biotech in Los Angeles is enormous.”

Michelson Hall is opening just as a group of more than 20 organizations and institutions, including USC, have formed the Alliance for Southern California

Innovation to promote the growth of entrepreneurship, technology and life sciences in the region. The building itself is USC's initial footprint in a biotech and tech corridor in Los Angeles.

A meeting of scientific minds

The researchers moving into Michelson Hall all have a history of innovation and collaboration. Some have already worked together on multiple studies or have partnerships with scientists across the university.

Ellis Meng, a professor at the Michelson Center and USC Viterbi, is accustomed to working with doctors and other scientists on her research that develops medical devices such as tiny sensors and electrodes for monitoring the brain. Meng collaborates with other researchers at the Keck School of Medicine and Children's Hospital of Los Angeles.

She said she expects many more partnerships will develop as a result of their convergence at Michelson Hall.

“We're at Michelson because we want to work with others,” Meng said of herself and the other scientists. “We are breaking down some barriers to working with other colleagues in engineering and other colleagues in chemistry and life sciences. Having many collisions frequently is what will prompt us to speak a common language.”
