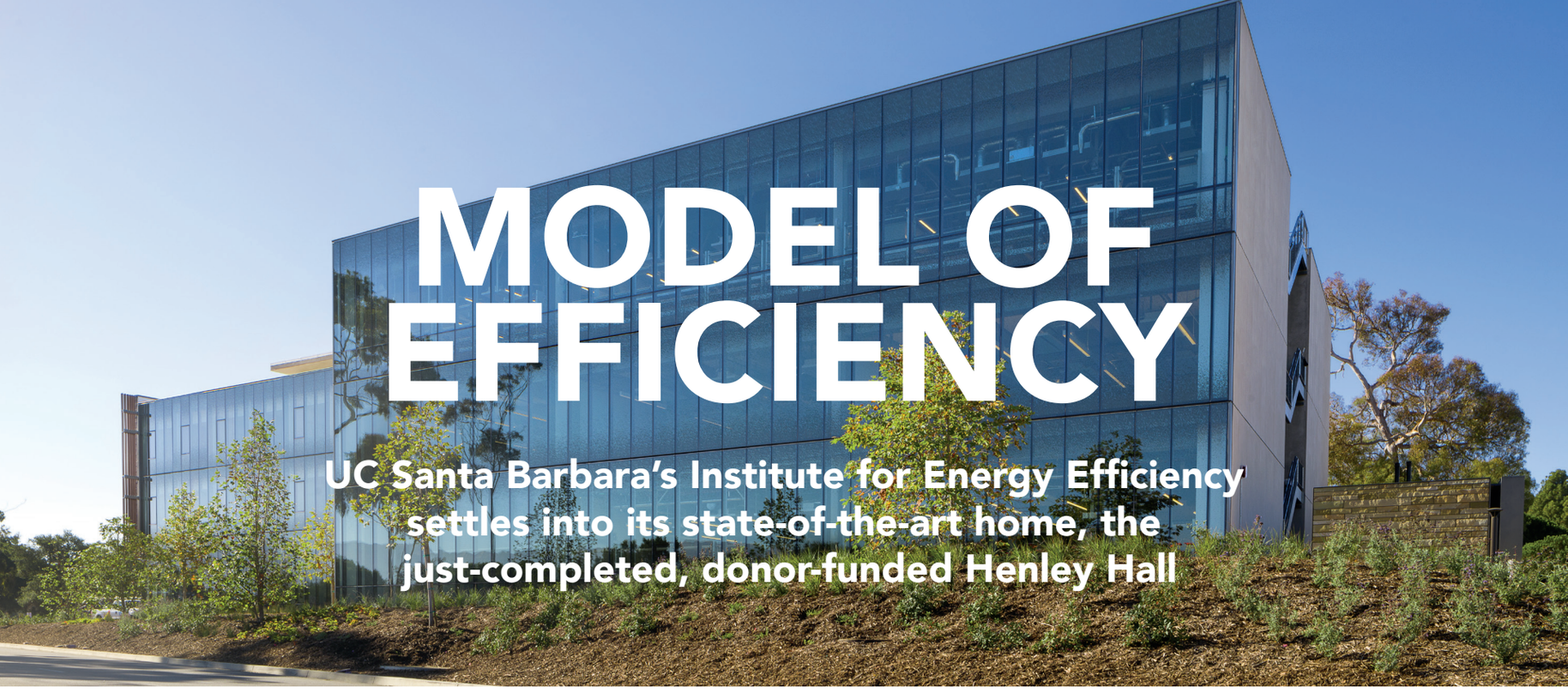


MODEL OF EFFICIENCY

UC Santa Barbara's Institute for Energy Efficiency settles into its state-of-the-art home, the just-completed, donor-funded Henley Hall

Labs in the new home of the IEE will stay cooler thanks to north-facing windows (above), which receive no direct sunlight.

Award-winning multidisciplinary research conducted by those affiliated with the Institute for Energy Efficiency (IEE) in the UC Santa Barbara College of Engineering has laid the foundation for numerous important energy-saving innovations. Among them are white LED lights, increasingly energy-efficient data-center communications and interconnects, and software that reduces energy usage in buildings. It is entirely fitting, then, that those researchers and the IEE itself have a shared home in an extremely "smart" new building, Henley Hall.

The 50,000-square foot structure was completed on time in September and is, technically, open for business, although the ongoing pandemic has limited its occupation to critical research projects in accordance with public health guidelines.

Years in the making, the building was funded by donors led by Jeff and Judy Henley, whose $50 million gift to the College of Engineering in 2012 sparked the project. More than $14.5 million was contributed by Silicon Valley–based alumnae Shawn Byers and her husband, Brook Byers.

"Judy and I wanted to support the priorities of the university and the College of Engineering by advancing the work of the Institute for Energy Efficiency," Jeff Henley said in describing their initial motivation for the gift. "Getting faculty into state-of-the-art facilities was critical to achieving that goal. With Henley Hall now complete, the institute is perfectly situated to create the new opportunities for research and teaching that can lead to pioneering, world-changing discoveries. They'll also be nourishing and preparing a new generation of scientists and engineers, who will surely push the boundaries of energy efficiency even further."

"It is hard to find the words to thank Jeff and Judy Henley for our new Henley Hall," said UCSB **Chancellor Henry T. Yang.** "From the initial concept of establishing an Institute for Energy Efficiency to the idea of creating a new building as the home of IEE, Jeff provided the vision, guidance, financial support, and encouragement for well over a decade. We are also deeply grateful to Shawn and Brook Byers for joining forces with the Henleys' inspirational vision and generosity. Our Institute for Energy Efficiency is now an exemplary model, a flagship at the frontier of energy efficiency, with the participation and collaboration of award-winning faculty across the disciplines. Thanks also go to Dean of Engineering **Rod Alferness,** Director **John Bowers** and faculty of the Institute, our generous and visionary IEE Director's Council members, as well as all of our researchers, students, and staff who have contributed to the Institute since its launch in 2008."

"Henley Hall provides critical research lab space in which our faculty and graduate students will discover and innovate solutions to address society's major challenges, especially in the area of increased energy efficiency," said Alferness. "The building sets UCSB up for success by establishing a collaborative, cross-disciplinary environment, which is important because it brings together faculty with diverse backgrounds and interests in an effort to maximize the public benefit of their pioneering research. We are extremely grateful to Jeff and Judy Henley, and to Shawn and Brook Byers for their generosity and support, which made this state-of-the-art building possible."

"There's a big need for lab space on campus," said Bowers. "We have a lot of new faculty, and many new initiatives that require space to be successful. Jeff and Judy's gift started the fundraising process for the building and inspired others to make significant gifts. Together, they are making UC Santa Barbara a stronger university."

Designed by architectural firm Kieran Timberlake and built by Sundt Construction Inc., Henley Hall includes 18 labs (a combination of both wet and dry), collaborative break-out spaces, conference rooms, a 124-seat state-of-the-art lecture hall, 34 offices for faculty and postdoctoral researchers, and various administrative offices.

Intended to house 20 engineering faculty members and 100-plus graduate students, the three-story structure is a model of efficiency and is on track to earn LEED Platinum status, the highest sustainability rating awarded by the US Green Building Association. Recycled materials accounted for 20 percent of the materials used in construction, and at least 75

percent of construction waste was specified for diversion from landfills.

"The building is designed to be really energy efficient, incorporating many new advances in technology and control," said Bowers, the Fred Kavli Chair in Nanotechnology, referring to active and passive features that enable Henley Hall to run with 40 percent less energy.

Igor Mezić, a UCSB professor of mechanical engineering who is director of the university's Center for Energy-Efficient Design and head of the IEE's Buildings and Design Solutions Group, contributed to the building's energy-saving smart features. For years, large buildings have been fitted with sensors to collect data, but no large-scale data analysis was done on it, so a lot of the data on air-conditioning, heating, and such were discarded. "In the past twenty years, however, the level of analysis once done by humans has been replaced by an automated algorithmic layer," said Mezić, whose algorithms will turn sensor data into substantial energy savings in Henley Hall.

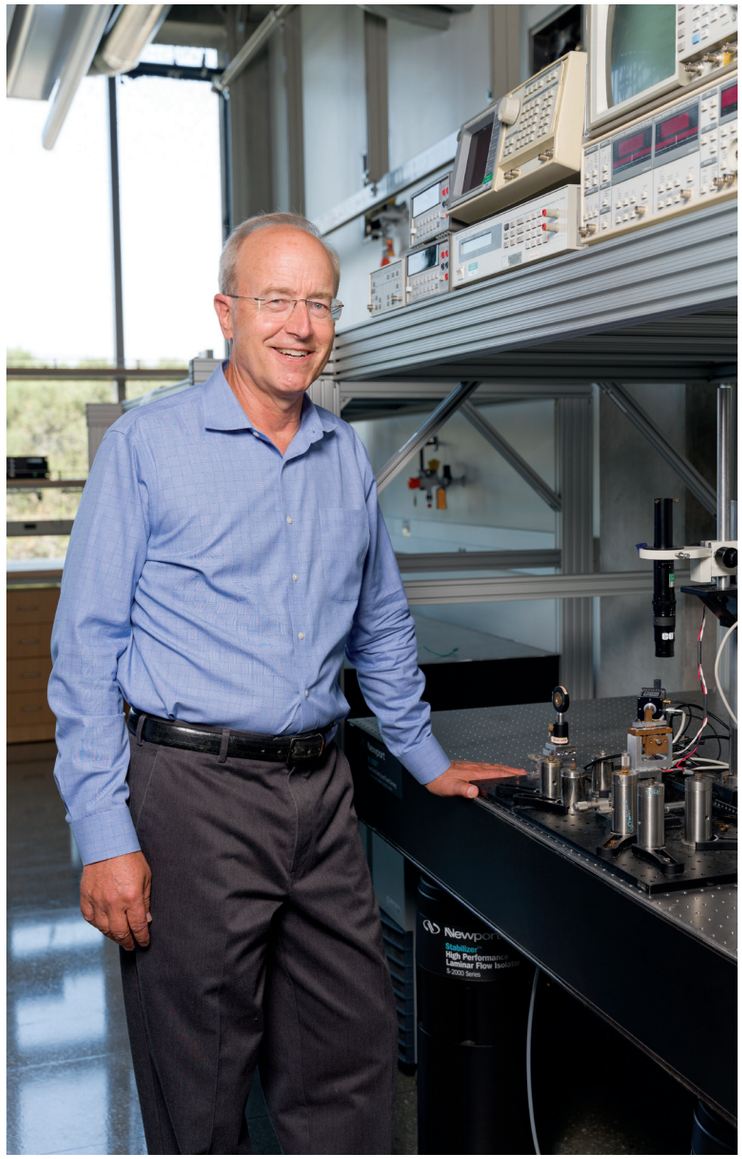
The building relies on natural ventilation and natural lighting. All lights are motion-activated and have sensor-controlled daylight dimming. Windows on the three-story central atrium have sensors and open or close automatically, depending on the weather. "It will be a guide for future buildings on campus," Bowers said.

The roof is supported by beams that have chilled water running through them to provide ambient cooling to the interior, a system that is much more efficient than conventional air-conditioning, which pushes a lot of air through, causing dust. Only the labs in the building rely on air-conditioning, because their temperature needs to be tightly controlled.

All the offices face north and are cooled naturally, and solar panels and a solar heat shield keep the south side of the building cool, aided by windows that incorporate the latest-design glass. "It used to be that to get this level of solar heat rejection, you'd need fairly dark glass, but the glass today is amazing; it's very clear but has little solar heat gain," Bowers explained.

"Energy efficiency is key to solving climate change and making U.S. industry more efficient in energy use and expense," he added. "Henley Hall is essential to expanding UC Santa Barbara's contributions to energy efficiency. Shared laboratories make it possible to bring researchers together to collaborate on important problems."

Specifically, Bowers noted, Henley Hall provides the space for IEE to expand its research in such important directions as developing more-efficient servers, more-efficient data communication, novel architectures and novel cooling approaches, quantum computing, and more-efficient chemical processing. "And, of course," he said, "we will expand our solid-state lighting research at UC Santa Barbara."



Institute for Energy Efficiency Director John Bowers visits a Henley Hall lab, where he will be working soon.

A formidable wet-lab array awaits the arrival of equipment in newly completed Henley Hall.