Stephenson Life Sciences Research Center a Showcase for Real-World Research

by Jerri Culpepper

In planning the design of the Stephenson Life Sciences Research Center, creating an open, airy atmosphere was considered to be critical. No one has to travel far to see the wide Oklahoma sky and lawn and gardens. Even the inside space was designed to create a feeling of transparency, with glass used in place of walls.

The Stephenson Life Sciences Research Center: Quick Facts

■ The Stephenson Life Sciences Research Center is located on OU's growing Research Campus, a world-class research and education hub that houses university research and education programs (.edu), federal research and operations (.gov), and the private sector (.com, .org., .net) in a setting that promotes creative thinking, stimulates synergy and produces practical outcomes for society.

■ The 160,000-square-foot, three-story building houses:

- the research and administrative functions of the Department of Chemistry and Biochemistry as well as a number of chemists, biochemists and other life science researchers
- and some 30 research teams composed of graduate and undergraduate researchers, technical staff, faculty, postdoctoral fellows, and visiting scientists
- as well as several Research Support Services units, such as the Nuclear Magnetic Resonance facility, Mass Spectrometry Laboratory, a glassblowing shop to provide vessels necessary to research, the Electronic and Mechanical Shops, and a stockroom, which will serve the larger OU Research Campus as new units move to the area.

"Better living through chemistry" – a variant of a popular ad slogan used for many years by a major chemical company – isn't just a catch phrase for University of Oklahoma Department of Chemistry and Biochemistry Chairman George Richter-Addo; it is a credo to which he is fully and passionately committed. Many of the products that help people live safer and more comfortable lives or ease the suffering caused by disease, he points out, were discovered and developed by chemists.

When people think about chemistry, Richter-Addo believes many people envision a solitary individual in a laboratory coat working away on a secretive and obscure project or conducting research with applications of little or no concern to human welfare.

That's why, when he had the once-in-a-lifetime opportunity to work with a team of OU research students, faculty and administrators to help guide the design of the Stephenson Life Sciences Research Center – which houses OU's Department of Chemistry and Biochemistry as well as several other university research functions – he placed an emphasis on transparency, both physically and metaphorically.

Glass is a dominant feature throughout the facility. Even the faculty offices feature glass walls, enabling students to observe their teachers as well as the reverse. Rather than dozens of isolated small laboratories dedicated to individual researchers, the Stephenson Life Sciences Research Center is home to interconnected flexible work spaces designed to encourage cross-disciplinary studies critical to human safety and wellbeing.

"We are a participant in the Carnegie Foundation's *Carnegie Initiative on the Doctorate*, and we provide real-life hands-on training to all our students so that they can meet the challenges of tomorrow," Richter-Addo said. "The open-laboratory concept allows students in one specialty area to interact with other students and faculty in a general concept area. Such interactions promote a wider, deeper understanding of the problems being tackled by funded research."

Also as a means of encouraging collaboration, the facility was designed with common spaces. Three large commons – one on each floor – encourage interaction between the scientist researchers, students and members of the community. All feature floor-to-ceiling windows, affording panoramic views of the Oklahoma skyline and OU's beautiful landscape.

One space, in particular, was created with an eye to drawing visitors. The aptly named "Petting Zoo" – an interactive education laboratory designed to showcase how chemistry and life sciences research impacts everyday life – features a large picture window for close-up viewing from the second-floor community area. Richter-Addo

noted that the merger between functional lab space and an open community commons is intended to entice the larger community to inquire and explore about what the building's research teams are doing. To help draw interest, commonly found objects like birds' nests, dirt and twigs (displaying inherent biological chemistry) are juxtaposed with scientific tools like centrifuges and high-powered microscopes.

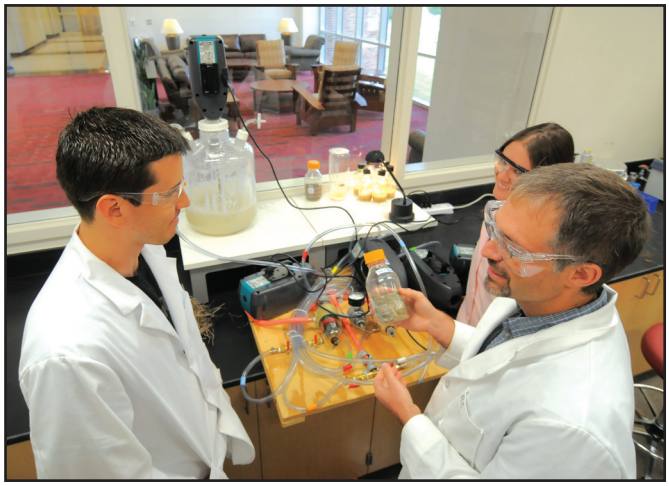
"We have taken the concept of chemical synthesis and applied it in a whole new way; by blending research and public space, we are encouraging a fusion between science and community," Richter-Addo said.

When their interest is piqued, the visitor can learn about current research, such as that being conducted by Robert Cichewicz, assistant professor of chemistry and biochemistry, who, with the support of two large National Institutes of Health grants, is discovering and testing natural medicines derived from plants and fungi that will, hopefully, serve as the cornerstone of new treatments for neurodegenerative diseases such as Huntington's and Parkinson's.

Richter-Addo hopes that, by making chemistry and life sciences research visible and by showing its relevance, more young people will consider pursuing studies and careers in chemistry and biochemistry. He is also hopeful that better understanding will lead to increased community involvement.

One thing that is immediately transparent when discussing the new facility with Richter-Addo is how excited he is about this new, state-of-the-art facility and the role it will play in preparing OU students for careers in chemistry and biochemistry.

"I just love this place!" he exclaimed recently, adding his deep appreciation to the Oklahoma Legislature, OU President David Boren, and Charles and Peggy Stephenson "for their investment in this one-of-a-kind research facility."



From inside the "Petting Zoo," Robert Cichewicz, assistant professor chemistry and biochemistry, collaborates with Ph.D. chemistry and biochemistry student Katie Branscum and research associate Jarrod King. Supported by two large National Institutes of Health grants, Cichewicz and his team are conducting research to isolate and test natural medicines derived from plants and fungi, which may someday be used in the treatment of such neurodegenerative diseases as Huntington's and Parkinson's.

Dennis Awasabisah, a Ph.D. student in synthetic and biological inorganic chemistry, studies the roles that metals play in the human body.

The research taking place in the Stephenson Life Sciences Research Center has real-world implications in areas as far-ranging as health to energy. A few examples:

Biological signaling: Nature employs small molecules as signals in cells to elicit appropriate responses to environmental stimuli. One such small molecule is "nitric oxide" that regulates normal blood pressure in humans.

Overcoming antibiotic resistance: Some infectious bacteria have developed resistance to antibiotics. Scientists in the Stephenson Life Sciences Research Center are studying the mechanism by which people may overcome antibiotic resistance.

Structural biology: Knowing the structures of essential proteins gives clues to their function. A team of scientists in the Stephenson Life Sciences Research Center have spearheaded the formation of the statewide Oklahoma Structural Biology Nexus, which also includes participants from the OU Health Sciences Center, Oklahoma State University, Langston University, Cameron University, the University of Central Oklahoma, the Noble Foundation, the Oklahoma Medical Research Foundation, and the company Comentis. The Oklahoma Structural Biology Nexus uses X-ray technology to determine the three-dimensional structures of proteins; knowing the structures of targeted proteins in diseases allows one to better search for and develop appropriate drugs to combat the diseases.

Artificial organ rejection: The acceptance or rejection of artificial organs and implants rests to a large extent on the interactions of the organ surface with the immediate natural environment within the host. Scientists are developing strategies to allow for better productive contact between the surface of artificial organs and implants with the host recipient to reduce the likelihood of organ rejection and failure.

Biomaterials: Scientists are using nanotechnology to decipher ways for the natural repair and regeneration of bone and teeth, and are using newly developed nanoparticles for targeting drugs to specific cancer cells.

New batteries: A multidisciplinary team is developing new technology for the production of new-generation batteries for energy research.

Genomics: Scientists are using a genomics-based approach for combating deadly diseases such as malaria.