



Clemson University opens Patewood bioengineering lab at GHS

 MEDIA RELEASE

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GREENVILLE, S.C. — From their fourth-floor state-of-the-art laboratory in the heart of Greenville Hospital System University Medical Center's Patewood campus, Clemson University bioengineering scientists and students help keep the feet of joint replacement patients on the ground.

The new facility, which opens this week, houses one of the country's largest stores of post-use total joint replacements: hip, knee and other artificial joints that were removed from patients, in some cases after 15 years or more of use.

John DesJardins, director of the [Frank H. Stelling and C. Dayton Riddle Orthopaedic Education and Research Laboratory](#) at the Clemson University Biomedical Engineering Innovation Campus, or CUBEInC, at Patewood, leads a program that analyzes these implant retrievals with the end game of improving the quality of life of patients.

DesJardins and his team study and catalogue how joint replacements have performed over the years, such as how different materials wear out during natural movements of the body.

Clemson's research is used by manufacturers to improve their products, which hopefully will lead to fewer repeat total-joint replacement procedures. Such advances help reduce medical costs and spare patients a return to what often is painful and invasive surgery.

"Essentially, we're trying to improve the entire procedure," DesJardins said. "We're trying to make these joints last longer and longer, because they're like highly engineered car tires — they eventually will wear out."

Clemson's new 30,000-square-foot research facility at Patewood houses 10 laboratories, plus offices and conference areas. More than 100 faculty, staff and students will use the laboratories as Clemson adds another dimension to its bioengineering degree programs.

For example, DesJardins supervises 65 bioengineering students who are visiting the hospital campus as part of their senior year design projects. The students are working with clinicians to design new medical technology, tools and devices to improve the health care of patients.

During two semesters, the students will identify needs and design potential solutions. Their innovations may lead to patents or small business startups, DesJardins said.

Clemson University President James F. Barker said the university has a rich history in biomaterials and bioengineering. The Patewood facility and [Greenville Hospital System University Medical Center](#) partnership will be home to some groundbreaking medical technology.

“Our researchers truly are at the leading edge of science,” Barker said. “When Clemson students are exposed to innovation on this scale, the value that’s added to their education is significant.”

Also in the facility, bioengineering professor David Kwartowitz runs four fully equipped ultrasound rooms where he works with students to study, among other conditions, why people suffer rotator cuff tears.

In collaboration with the [Steadman Hawkins Clinic of the Carolinas](#) and [Proaxis Therapy](#), Kwartowitz is working with eight Clemson undergraduate and graduate students to gather data on how and why patients experience the condition.

And in a nearby lab, Ph.D. candidates Lee Sierad and Jeremy Mercuri are deep in the heart of the campus in an entirely different sense of the word.

Sierad, who specializes in cardiovascular tissue engineering, is researching ways to repair damaged or diseased human tissue using the body’s own adult stem cells. He works with aortic roots, which contain the aortic valve — retrieved from pigs and other animals — to literally grow human cells on the root.

The intent is that the root can be transplanted in a patient with a heart valve defect and stand a better chance of not being rejected by the body. The root will contain the patient’s own adult stem cells, which the body may not consider “foreign.”

Mercuri, who will receive his doctorate from Clemson this month, specializes in orthopedic regenerative medicine. He works side-by-side with surgeons at the Steadman Hawkins clinic, located two floors down from the Patewood research labs. His primary focus is to improve patient care through engineering cartilage and tendon tissue using adult stem cells in combination with biomaterials that mimic native tissue architecture.

The Patewood facility represents another strong Clemson partnership, said Martine LaBerge, chairwoman of the [bioengineering department](#) at Clemson.

“Greenville Hospital System is a wonderful partner for Clemson,” LaBerge said. “Where Clemson has a comprehensive understanding of biomaterials, the hospital system is the go-to organization in Upstate South Carolina for medicine and surgery.

“When these areas of expertise are combined, there exists a real opportunity to make a difference in the quality of life of the people of our state,” she said. “The Patewood facility is an important economic development driver for South Carolina.”

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