the NEWSSTAND

A quarter century of health innovation

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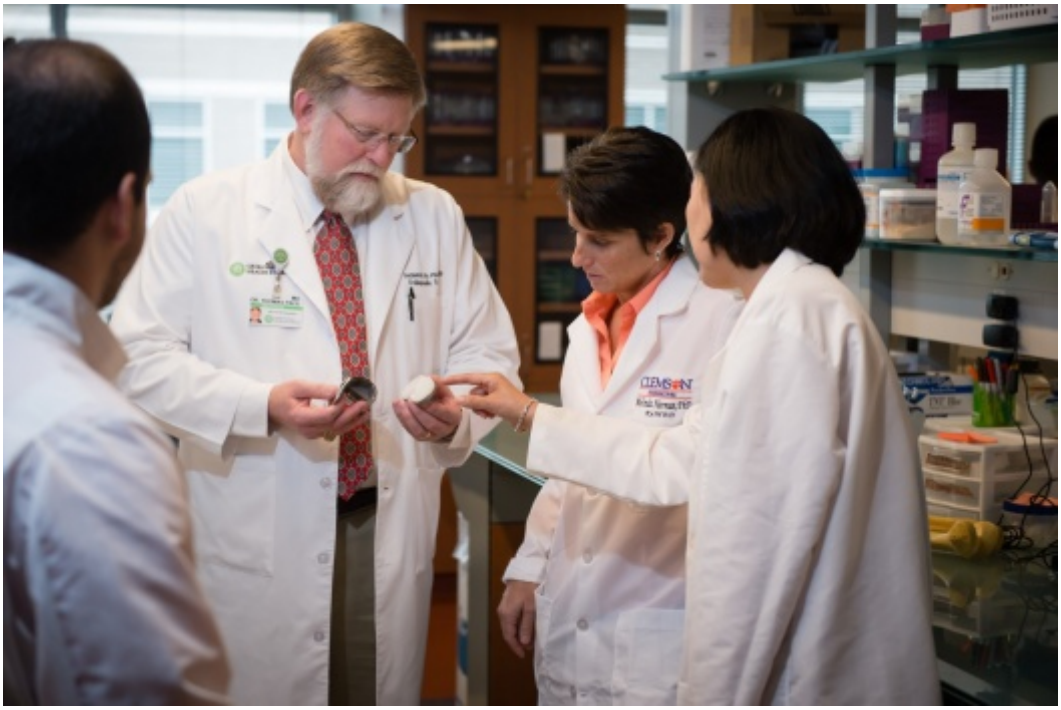
Clemson has a long history of innovation in health care and medical technology, thanks in part to collaborations that bring faculty and students together with surgeons and other practitioners to solve real-world problems. Perhaps the longest-standing partnership is one that has evolved from fairly modest beginnings to a first-of-its-kind "clinical university" in Greenville.

Faculty-led teams based in Greenville are tackling some of the greatest health challenges facing the state and nation, such as childhood obesity, prenatal care, vascular care, treatment of orthopaedic injuries, helping soldiers transition to civilian life, infirmities related to aging and health disparities, to name just a few.

A biomedical research agreement signed in 1990 laid a foundation for what is now a major force for innovation, education, economic impact, workforce development and – most importantly – better health care for South Carolinians.



Many Clemson faculty and and students are engaged in research with Greenville Hospital System collaborators through two major programs – CUBEInC and the clinical university.
Image Credit: Clemson University

"We have a saying at GHS – 'better together.' Our unique partnership has a multiplier effect so that we can tackle more complex

problems, compete for larger grants and achieve greater things than any of us could accomplish alone," said Windsor Sherrill, chief science officer at GHS (now the Greenville Health System) and associate vice president for health research at Clemson.

Spence Taylor '79, who serves as Vice President of Physician Engagement, Chief Academic Officer and President of the GHS Clinical University, agrees. "By working together, GHS and Clemson have created a research engine that is accelerating improvements in the quality of health care and serves as an incubator for new ideas and initiatives," he said. "Simply put, we are leveraging resources in order to accomplish more than any one of us could by ourselves. Together, our work is not only benefiting patients in the Upstate, but it is transforming the way health care is delivered nationwide."

Initially, the biomedical agreement paired a handful of Clemson bioengineering faculty and graduate students with the hospital's surgeons and medical professionals to focus on building better and longer-lasting implants, such as those that replace worn-out or damaged knees and hips – an area where Clemson had an established national reputation as a pioneer.

Today, dozens of faculty and hundreds of students from every college are engaged in research with GHS collaborators through two major programs – both of which are poised for greater expansion.

CUBEInC

The Clemson University Biomedical Engineering Innovation Campus, or CUBEInC, was officially launched in 2011 at the GHS Patewood campus, with 30,000 square feet of space where faculty and clinicians team with corporate collaborators to more quickly move biomedical innovations to real-world application.

CUBEInC's 30,000 square feet of space in Greenville is quickly filling up and fulfilling the mission to more quickly move biomedical innovations to real-world application
Image Credit: Clemson University

Numbers tell part of the success story. Since 2011, CUBEInC has grown from

- five faculty and researchers to 15,
- 75 students to 179 and
- four doctoral students to 20.

Plus a five-year total of more than $16 million in funded research, 78 intellectual property disclosures and seven Clemson start-up companies.

One of those patent-pending and licensed inventions is a novel chest tube-stabilization device called the AssureFit, developed by a bioengineering design team under the guidance of Professor John

DesJardins and two GHS surgeons — Dr. John Chandler, Senior Medical Director for Pediatric Surgical Services, and Dr. Robert "Bob" Gates, Pediatric Surgeon.

The AssureFit helps prevent surgical drains from dislodging following procedures, saving time and medical expense, and also allows for greater patient mobility and comfort. It won a $10,000 first-place award in the National Collegiate Inventors and Innovators Alliance (NCIIA) BMEStart undergraduate design competition, but it's the connection to CUBEInC that is helping move it into the marketplace. TAO Life Sciences, a private company that invests in and helps advance medical innovations, is working with Clemson and GHS on the next phase of studies, design refinements and performance evaluations.

"The success of AssureFit project is a perfect example of how a facility such as CUBEInC can accelerate the translation of biomedical technologies to market," DesJardins said. "It brings together clinicians, students, faculty and companies, and allows them access to world class laboratory and surgical skills facilities. Together, they can identify critical unmet clinical needs and develop novel solutions to improve human health."

Bioengineering Department Chair Martine LaBerge says the only limiting factor she sees ahead is space to allow for continued growth. She envisions a health technology research district capable of supporting larger-scale research, clinical work and enhanced commercial development.

"The space we have now is being increasingly filled as we generate more research, bring in more students and add more corporate partners, which means CUBEInC is fulfilling its mission," she said. "The demand for health innovation will only continue to grow, and we have an opportunity to meet that demand in Greenville, which will benefit Clemson, the Upstate's economy, and the quality of health care."

The Clinical University

In 2013 Clemson was designated GHS's primary research collaborator, adding research muscle to the health system's alliance with the University of South Carolina School of Medicine as well as its undergraduate programs with Furman University. The unique collaboration helped GHS earn "Academic Health Center" status – a designation held by only 2 percent of health systems in the country. And it's the nation's first hospital-centric model to be given that designation, creating a new model dubbed the "clinical university."

Working daily at GHS are two endowed professorship holders, three faculty fellows, three embedded scholars and eight post-doctoral fellows. More than 40 proposals valued at $42 million have been submitted since the collaboration's launch two years ago.

One of those embedded scientists is public health sciences faculty member Sarah Griffin, who is working with the hospital's department of pediatrics on research in childhood obesity and pediatric

population health management. South Carolina has one of the nation's highest rates of childhood obesity, according to the Centers for Disease Control.

Griffin's expertise in behavioral science, intervention design and delivery, and program evaluation will help GHS better understand the effectiveness of existing efforts and focus on new ways to prevent and treat obesity through the influence of social and behavioral factors.

"Obesity has become the 'new tobacco.' It is widely considered the leading cause of preventable deaths in the United States," Griffin said. "Thus, it is vital that we have a better understanding of the effectiveness of the programs we are doing to prevent and treat obesity, especially programs for our youth."

While health education and research initiatives aren't uncommon across the country, Sherill says the extent of Clemson's collaboration with GHS is truly unique. "With programs in nursing, public health, bioengineering and industrial engineering collaborating on both research and education, Clemson's influence is significant and growing," she said "We are truly transforming health care, working together to improve health delivery for the community and the people we serve, as well as addressing issues of cost, access and quality."

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