S tewart Lee came to the University of South Carolina School of Medicine Greenville with no interest in research; his dream was to become a doctor. However, now that he and fellow medical student Geevan George have just completed and published their first research project in a scientific journal, ISRN Biomaterials, Lee looks at research differently.

“I had no clue how powerful and practical research can be for physicians and their patients. It turns out I like research,” said Lee.

South Carolina’s newest medical school, the USC School of Medicine Greenville, requires all of its students to complete a patient-focused research project as part of their education. The prerequisite is an important part of the School of Medicine mission to create a new generation of physicians who don’t accept the status quo and instead rely on research and evidence-based medicine to determine the best care for patients and society.

Lee and George turned to Dr. Thomas Pace, a medical school faculty member and Greenville Health System orthopedic surgeon, for direction on their research project. He suggested they compare the performance of two knee joint devices, a traditional implant made of cobalt chrome, and another made of an advanced material, oxidized zirconium.

Dr. Pace explained his rationale for suggesting the study. “It gets down to doing what’s truly best for the patient and economics. In 2013, 450,000 total knee joint replacement surgeries were performed. By 2030, that number is expected to be 3.5 million. There’s a huge variation in the cost of knee joint devices; newer devices can cost as much as 50 percent more than traditional devices. Do outcomes justify the cost? That’s something we need to determine.”

Lee and George access to data on 120 knee replacements using the two knee devices. Dr. Pace also enlisted Nicole Durig, then a Master’s candidate in Bioengineering at Clemson University, to assist Lee and George with their study based on her research, engineering and metallurgy experience.

“We didn’t have a clue at first,” said Lee. “With Nicole’s help, we learned the nomenclature and process of research.”

Laboratory simulations conducted by the manufacturer showed the more costly oxidized zirconium knee joint device performed better than the cheaper device. How something works in a controlled lab setting can be very different than the real world. As part of their analysis, Lee and George reviewed patient outcome data with the two devices, including patients’ range of motion, flexion, pain, and overall movement. They also compared radiographic studies. What they learned about the devices’ performance surprised them.

“The lower cost device yielded the same results as the costly device,” reported Lee. “What they learned from the process of thoroughly analyzing both devices was perhaps even more important.”

Lee explained. “The science behind the more expensive joint device is stout; you assume it’s better based on the metal and design. But when you put the device in a human, the difference in outcomes between it and the other device was negligible. It showed me that physicians have to do their homework.”

Added George, “As physicians, we can’t keep spending healthcare dollars like we did in the past. We have to identify products and procedures that are clinically effective and cost efficient.”

Dr. Pace is satisfied with the project’s results. “These young men learned they have to question, investigate, and become critical thinkers. It was a lesson well learned.”

Jerry Youkey, MD, Dean
USC School of Medicine Greenville

NICOLE DURIG,
MASTER OF BIOENGINEERING, CLEMSON; MEDICAL STUDENT, MUSC

2013 HSSC ANNUAL REPORT
INVESTING IN HUMANITY
**MEMBER ORGANIZATIONS:**

**Partnering to Make Good Health Possible**

Health Sciences South Carolina members include the largest research-intensive universities and health systems across the state, which equates to a powerful agent for change.

**AnMed Health** is South Carolina’s largest independent, not-for-profit health system and includes three licensed hospitals: AnMed Health Medical Center, AnMed Health Rehabilitation Hospital and AnMed Health Women’s and Children’s Hospital. It also operates a cancer center, Level II trauma center, cardiac and orthopedic centers, three outpatient surgery centers, a family medicine residency program, and physician practices throughout the Upstate and northeast Georgia.

**Clemson University** is ranked 21st among national public universities, ranked 15th in national universities in U.S. News & World Report. Clemson is highly ranked for quality, value, return on investment and efficiency by Princeton Review, Kiplinger’s and U.S. News & World Report.

**Greenville Health System** is committed to medical excellence through patient care, research and education. GHS offers patients a comprehensive network of expertise and technologies through its six medical campuses, tertiary medical center, research and education facilities, community hospitals, physician practices and numerous specialty services throughout South Carolina’s Upstate. It also is home to one of the nation’s newest medical schools, University of South Carolina School of Medicine-Greenville.

**McLeod Health** is recognized nationally for its quality initiatives and methodology. McLeod Health has a leading regional presence in northeastern South Carolina and southeastern North Carolina. McLeod is constantly seeking to improve its patient care with efforts that are physician-led, data-driven and evidence-based. Founded in 1906, McLeod Health is a locally owned and managed, non-profit organization.

**Self Regional Healthcare** is a not-for-profit, referral center and tertiary care facility located in Greenwood that serves a seven-county region known as the Lakelands. In 2010, Self Regional received the South Carolina Governor’s Quality Award and for four straight years has earned the Gallup Great Workplace Award as one of the top 25 places to work in the world. Self Regional is a teaching hospital, graduating 10 family medicine physicians annually.

**Spartanburg Regional Healthcare System** is an integrated healthcare delivery system in the Upstate. Spartanburg Regional is nationally recognized for excellence in nursing and is among the fewer than three percent of hospitals nationwide to achieve Magnet designation, nursing’s top honor. In 1983, the National Cancer Institute named Spartanburg Regional one of 50 sites for a Community Clinical Oncology Program. Today, the program at the Gibbs Cancer Center provides patients all the benefits of a major research hospital.

**University of South Carolina** is the only South Carolina institution that has received the highest ranking by the Carnegie Foundation as an institution with “very high research activity.” USC’s sponsored research awards have totaled more than $200 million per year each of the last six years. USC’s faculty and students engage in a diverse array of research and scholarly activities that promote innovation across multiple disciplines, including health sciences, advanced materials, energy, environment and sustainability.

**University of South Carolina School of Medicine Greenville** is South Carolina’s newest medical school, located at the heart of the Greenville Health System and backed by two decades of partnership in providing comprehensive medical education to students from the University of South Carolina. Medical students develop leadership, clinical, and interpersonal skills essential to delivering the next generation of patient-focused healthcare with confidence and compassion.