the NEWSSTAND

Bioengineers see big opportunities in medical device industry

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Clemson University bioengineers are working to expand a program that teaches students how to clean, sterilize and design medical instruments so they can be reused, a practice at the center of a fast-growing industry that helps cut back on biohazardous waste and reduces hospital costs.

Melinda Harman, an assistant professor of bioengineering, said that the GreenMD program is beginning to produce a regular crop of graduates, including six in August, and that hundreds of other students have taken classes as electives.

The program started in response to an industry that has grown up around medical-device reprocessing, which is closely regulated by the Food and Drug Administration. Many instruments, ranging from ankle braces to cautery devices, can be reused but only if they are cleaned and sterilized according to strict protocols.

Melinda Harman, right, works with GreenMD students Jorge Hernandez, left, and Megan Hanschke at he Clemson University Biomedical Engineering Innovation Campus, or CUBEInC.

It's an issue growing in importance. Recent infections linked to contaminated devices at hospitals have made patient safety a top priority, Harman said.

Cleaning and sanitizing devices is not as simple as soaking them in alcohol or steaming away the germs. Some devices come with a 50-step cleaning process.

"We can make a positive impact on patient safety by designing instruments that are easier to clean," Harman said.

The GreenMD program allows graduate students to either pursue a certificate or take classes as electives toward graduate degrees. Harman's growth strategy is to reach out to students in majors outside bioengineering and to working professionals interested in expanding their knowledge to include medical device reprocessing.

The courses are a great fit for all engineering disciplines, especially industrial, electrical and mechanical engineers, she said.

Jorge Hernandez, who created a device as part of his studies, received his certificate in the program and is headed for an internship with the FDA.

“Looking out in the job marketplace for bioengineers, there are a lot of job openings for people who have knowledge about this,” Hernandez said.

Some other programs in the field are focused on medical device design, and some emphasize cleaning and sterilization. None but Clemson’s integrate the two fields, Harman said.

The lab most often used by students and faculty members in the program is at the Clemson University Biomedical Engineering Innovation Campus, or CUBEInC. The campus encompasses an entire floor of a high-rise building at Greenville Health System’s Patewood campus.

The GreenMD curriculum was developed with input from two industry leaders, STERIS Applied Sterilization Technologies of Spartanburg and Stryker Sustainability Solutions of Phoenix. Several of the program’s students have had internships at STERIS and other local employers

Megan Hanschke said she saw the GreenMD program as a way to set herself apart in her master’s program.

“It seemed like a new, up-and-coming field, something that would be really useful and a job that I would want,” she said.

Clemson’s Board of Trustees approved the GreenMD program in October 2011, classes began in 2013 and the first graduates completed the program in 2015.

Joey Lowe, plant manager at Applied Sterilization Technologies-STERIS, said the collaboration between the company and Clemson is mutually beneficial.

“STERIS AST in Spartanburg hosts multiple tours annually with the Clemson bioengineering department,” he said in a written statement. “The Spartanburg facility provides both of the major sterilization technologies, gamma radiation and ethylene oxide gas, and the tours allow students to see firsthand how medical devices are sterilized.

“The facility visits are also single-day classes with a ‘sterilization 101’ overview of both gamma radiation and ethylene oxide technologies. It provides STERIS AST an opportunity to interact directly with intelligent and talented students that will soon enter the bioengineering and medical device manufacturing and sterilization industry workforce.

"Our facility implemented an internship program in 2016 dedicated solely to Clemson University with the hopes of attracting students interested specifically in the medical device sterilization industry. We expect the partnership with Clemson University to continue to grow in the future."

Martine LaBerge, chair of the Department of Bioengineering, said the program underscores the department's long history of leadership in research and education in close collaboration with industry.

"GreenMD increases students' marketability in the medical device industry and creates a new paradigm in healthcare education," LaBerge said. "I'd like to congratulate our latest crop of graduates for a job well done."

To learn more, go to the program's website at:
http://www.clemson.edu/cecas/departments/bioe/academics/certificate.html

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