STUDENT spotlight

Inventing the future

Student biomedical projects could end up at hospitals everywhere.

Nathan Cox was part of a team that created a more efficient way to lower a patient's body temperature during a major trauma. The team presented its work at WakeMed this spring. *(Photo: Julianne Macie, WakeMed)*

Not all of the inventions produced in NC State's biomedical engineering program were created by veteran researchers with PhDs.

Many of the inventors are undergraduates, and their creations could become commonplace in clinics and hospitals all over the world. The top-notch students of the Joint NC State-UNC Department of Biomedical Engineering (BME) continue to break ground in this relatively new field.

"It was just really interesting to see how many different research opportunities are available (in biomedical engineering) because we don't know so much about it," said Sneha Rangarao, a senior who helped invent a super-absorbent floor mat. "It's a growing field."

Rangarao and other students designed the floor mat for Senior Design, the department's capstone undergraduate course. The students teamed up to work on the projects, gleaning ideas from local hospitals that had problems that needed solving. This year's NC State senior design group saw teams working with WakeMed, Rex-UNC Health Care and NC State's College of Veterinary Medicine and Department of Mechanical and Aerospace Engineering.

Projects are derived by students using a process involving an assessment of real clinical needs. Andrew DiMeo, the senior design instructor, believes this process helps "lead to the prolific invention disclosures we submit from this course." This year's senior design group produced 10 invention disclosures, up from seven last year.

DiMeo, director of industrial relations for the department, brings his own experiences to the course. He had been a graduate student in BME at UNC-Chapel Hill before taking a leave of absence to start a family. He entered the private sector, work that included time at Alaris Medical Systems and Gilero, a service company he co-founded that specializes in high-volume medical devices. He also founded the North Carolina Medical Device Organization, a nonprofit with a mission to make the state's medical device and diagnostic industry a world leader in research, development and production.

DiMeo stayed close to NC State, serving on the Board of Advisors to the undergraduate BME program and befriending Dr. Frank Abrams, who ran the senior design course at the time.

When Abrams retired a few years ago, the department was looking for someone with real-world experience and industry connections to lead the course. DiMeo was a natural fit.

Several of the projects DiMeo has shepherded through senior design show great promise to enter clinics. Among them are a fluid control system for patient simulators and a positioning device that allows X-Rays to show the appropriate part of a patient's leg without interference or patient discomfort.

Rangarao's team got its idea by observing operating rooms at WakeMed. When team members spoke with doctors about the various challenges they faced, the students found that the risk of blood, saline solution and other fluids falling to the floor created safety hazards during surgeries. The current method of cleaning it up was to put a bunch of rags on the floor, Rangarao said.

So Rangarao and the rest of her team designed a disposable, inexpensive floor mat. A couple of investors who saw the mat this spring liked what they saw, so it could have a future in operating rooms.

"There is an interest in it," she said. "Definitely." ■

For more information on the senior design program in biomedical engineering, visit ***www.bme.ncsu.edu/seniordesign.***

Above: Katie Woodruff and Peter Hamilton show off their senior design project, a unit that neatly houses EKG wires during a stress test, during a symposium in Research Triangle Park.

Below: Andrew DiMeo is the senior design instructor for NC State's biomedical engineering program. *(Photo: Julianne Macie, WakeMed)*