

NC State, WakeMed Team in Device Hunt



Even before she heads off to med school, Kat Sauer has a medical device invention to her credit. Then again, so does every other student who has taken the senior design course in the Department of Biomedical Engineering (BME) in the last two years. Course director Andrew DiMeo's efforts to make the course more entrepreneurial in that time have produced 17 invention disclosures and a new partnership with Wake Medical Center.

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Instead of gathering a list of possible design projects from various end-users and assigning them to students, DiMeo wanted to emulate the U.S. Food and Drug Administration's design control process for medical devices. That involves defining a problem, cataloging inputs, and describing how each one led to the final output. DiMeo used the process himself—he worked as a project manager for a medical device company and co-founded a company that provided mechanical engineering services to device companies—before coming to NC State. “There are lots of different design processes,” he says. “The best practice is hands-on, need-based design.” He now sends teams of BME students to find problems in various clinical settings and then develop solutions.

Sauer's team, for example, determined that WakeMed Emergency Services needed an efficient, portable way to chill saline for cardiac patients. Research has shown that inducing mild hypothermia shortly after a heart attack reduces the resulting neurological damage. Wake

County paramedics have to use separate vehicles with refrigeration units to deliver iced bags of saline when an ambulance responds to a cardiac emergency, Sauer says, and there's no way to regulate the temperature of the saline as it goes through an IV. The students devised a system in which a chemical reaction in an enclosed cylinder—similar to a first aid cold pack—chills saline as it moves through three metal coils inside. “It was the school of hard knocks. We had to get in there and figure out something that works,” Sauer says. “The problem-solving skills will no doubt help me in my career and in life.”

Teams of students are dispatched to various clinical settings to find problems and develop solutions.

WakeMed was so impressed with the results of DiMeo's students that it signed up every NC State team this year and made a donation to BME to defray the cost of supplies for the senior design class. Susan Jackson, WakeMed's vice president and chief learning officer, says the partnership solves problems WakeMed officials didn't even recognize, while also giving the hospital system a leg up on hiring talented biomedical engineers. “They're coming in with new eyes and innovative minds,” she says. “Working together, we can develop practical solutions to health care challenges.”

Instructor Andrew DiMeo turned the senior design course in the Department of Biomedical Engineering inside out by having teams of students go into clinical settings and develop solutions to some of the problems they find.



Biomedical engineering graduate Kat Sauer and her team devised a way for ambulances to chill saline IVs given to cardiac patients to lessen the neurological damage from a heart attack.