

College of Engineering Seminar Series

Can Needle-Sized Robot Tentacles Help Surgeons Save Lives?

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Tennessee State University, Torrence Hall, Room 126

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(Refreshments will be served)

Thin, flexible robots able to bend and elongate can help surgeons reach deeper and more accurately into the human body than ever before, through increasingly smaller incisions. This talk will cover recent breakthroughs in design, control, and sensing that are rapidly pushing the boundaries of surgical robotics to smaller scales, greater accuracy, and more effective interaction with surgeons. Mechanics-based models of elastic robots provide the basis for these advancements, which in turn provide the raw materials necessary for building effective surgical robotic systems. These systems can offer autonomous, teleoperated, or hand-held surgeon-robot interactions. The talk will cover both recent advancements in concentric tube robots, and also new ideas in reconfigurable parallel continuum robots that assemble inside the body. An important theme of the talk will be the fascinating process of partnering with surgeons to create robots suitable for real-world operating room environments that have the potential to be powerful weapons in the fight against lung disease, brain tumors, hemorrhagic stroke, epilepsy, deafness, and urologic disorders.



Robert J. Webster, III received his B.S. in electrical engineering from Clemson University in 2002, and his M.S. and Ph.D. in mechanical engineering from the Johns Hopkins University in 2004 and 2007. In 2008, he joined the mechanical engineering faculty of Vanderbilt University, where he currently directs the Medical Engineering and Discovery Laboratory. He founded and serves on the steering committee for the Vanderbilt Institute for Surgery and Engineering, which brings together physicians and engineers to solve challenging clinical problems. Prof. Webster's research interests include surgical robotics, medical device design, image-guided surgery, and continuum robotics. He is a recipient of the IEEE Robotics and Automation Society Early Career Award, the National Science Foundation CAREER award, the Robotics Science and Systems Early Career Spotlight Award, IEEE Volz award, and the award for Excellence in Teaching from Vanderbilt University.