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ELECTRICAL & COMPUTER ENGINEERING
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S E M I N A R

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Advancements in Medical Ultrasound Technologies and Applications

by

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Abstract: Ultrasound is a safe, cost-effective and versatile technology that is widely used to detect a variety of pathologies and to provide image guidance during medical interventions. According to the World Health Organization, one in four of all medical imaging procedures worldwide is ultrasound-based. Recent advancements in electronics, transducer technology, signal and image processing techniques have led to development of new ultrasound modalities and systems that offer superior spatial and temporal resolutions, allow both structural and functional imaging and can be implemented in small, portable devices that may be used in space, sports, military medicine or in developing countries where other imaging modalities may not be readily available. A unique feature of medical ultrasound is that it can be used not only for diagnostic imaging but also for therapeutics.
For the past seven years, our laboratory at Texas A&M University has focused primarily on three main projects: the development of novel ultrasound elasticity imaging modalities to assess the mechanical properties of tissues; the development of new musculoskeletal methods for regenerative medicine; and the use of High Intensity Focused Ultrasound (HIFU) for tissue ablation and enhanced targeted delivery. In this talk, I will provide an overview of the past and ongoing research in our laboratory and highlight potential future developments in view of the technological breakthroughs occurring in the field.

Raffaella Righetti received her B.S. 'Laurea' degree in electronic engineering from the Universita' degli Studi di Firenze, Italy in 1999. She received her M.S. degree and Ph.D. degree in electrical engineering from the University of Houston, Houston, TX, for her work on ultrasound elastography in the Dept. of Diagnostic and Interventional Imaging at the University of Texas Health Science Center, Houston, TX, in 2001 and 2005 respectively. She then pursued her postdoctoral work at the University of Texas, Houston, TX. She is currently an associate professor of electrical and computer engineering at Texas A&M University. Her research interests include the development of new ultrasound-based elasticity imaging methods, such as poroelasticity and viscoelasticity imaging techniques, therapeutic ultrasound methods and ultrasound-based imaging techniques for orthopedic applications.