Biomedical Engineering

W. Coulter Lecture Series Seminar

New Developments in Magnetic Resonance Technology:
MR Endoscopy, Radiofrequency Ablation, Bone Scanning

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Location: EC 2300

In addition to continuing advances in conventional MRI methodology and instrumentation for orthopedic, neuro and cardiac applications, a number of specialized areas are being invaded by MR technology. Small RF coils (the signal-detection transducers in MR) can be placed into catheters to measure MR spectra and images intravascularly or into endoscopes to scan within the GI tract. The heating effects of MR, normally regarded as safety risks to be avoided, can be used to accomplish tumor ablation in the liver or other organs. A specialized form of MRI, solid state MRI, can be used to measure bone mineral density and bone matrix density while avoiding the ionizing radiation exposure normally associated with bone scans.

This talk will describe examples of the above three applications that have been developed in our laboratory, focusing primarily on the technical and engineering issues involved in these special adaptations of MRI.

Jerry Ackerman earned a B.S. degree in Chemistry at the State University of New York at Stony Brook in 1971 and a Ph.D. in Physical Chemistry at MIT in 1976. Following a postdoctoral year at University of California, Berkeley, he joined the Department of Chemistry at the University of Cincinnati in 1977 where he conducted research on polymer and supported catalyst systems using solid state NMR spectroscopy on a home built NMR spectrometer. While at UC he developed a collaboration with the School of Medicine to build one of the first whole body MRI scanners. In 1984 he joined the MGH Department of Radiology and continued to work on MR technology as well as applications to polymers, composites, biomaterials, contrast agents and calcified tissue including bone and atherosclerotic plaque. He has authored over 80 papers and 5 patents.