



Southeastern Michigan Section
"Chapter IV" Speaker Series
Wed, Sept 30, 2009, 4:00 pm
Room # 1013 H.H. DOW Bldg,
North Campus, University of Michigan
2300 Hayward St., Ann Arbor, MI



Engineered Polymer Composite Materials for Antennas

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Abstract:

Antennas, or aerials, have been an active area of research for over sixty years. Many significant advances in antenna design methods, realized antennas, and applications of antennas have emerged from the academy – the University of Michigan leading the way. Understandably, one can presume that that the field is mature and that innovations have run their course. This is not the case. The two most significant changes that are coming, based on advances made in recent years both in design methods and in fabrication techniques, is in incorporating high-speed – really high-speed – electronics in the antenna aperture and in engineered materials. In addition, a variety of aperture designs are needed to meet application requirements such as conformal, end-fire radiation. In this talk, emerging polymer composite materials offer the potential for significantly changing antenna designs to meet challenging spatial and spectral requirements. These materials need to be characterized in the laboratory and then used in viable antenna designs. The characterization can be rather challenging if the material design is inherently anisotropic. A second theme will be an exposition on progress that has been made on leaky-wave antenna designs over the past several years. The focus will be on half-width, leaky-wave antennas due to their potential as a conformal aperture that can provide significant gain as a near end-fire radiator. With a better understanding of the radiation properties of these antennas, it is possible that polymer nanocomposites will also have a role in these apertures.

Speaker's Biography:

Leo Kempel is a Professor in the Department of Electrical and Computer Engineering and is the Associate Dean for Research in the College of Engineering at Michigan State University. He earned the PhD degree in 1994 from the University of Michigan and spent four years with Mission Research Corporation prior to joining Michigan State. He has served twice as an IPA with the Air Force Research Laboratory's Sensor's Directorate. He was instrumental in helping establish several significant programs at AFRL including the on-going Transformational Antennas and Metamaterials Programs. At MSU, Prof. Kempel inaugurated the High Performance Computing Center (HPCC) at MSU to provide advanced computational tools to faculty, staff, and students. Prof. Kempel was awarded an NSF CAREER grant and received awards from the College of Engineering and Michigan State University for scholarly promise. He is a Fellow of the Institute of Electrical and Electronic Engineers (IEEE) and the Applied Computational Electromagnetics Society (ACES) and was a member of the Administrative Committee for the IEEE Antennas and Propagation Society and a Director of the ACES.

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