



Technical Seminar Organized by

**Radio Communication Engineering Department (RaCED) and
IEEE AP/MTT/EMC Malaysia Chapter**

You are cordially invited to a seminar on

Design of Dielectric Resonator for Multi-Functions use in Microwave Circuits and Antennas

Speaker: Professor Ahmed A Kishk, University of Mississippi, USA

Time/Date: 2.30 - 5pm, 5 Jan 2011 (Wednesday)

**Venue: P03 Video Conference Room, Faculty of Electrical Engineering, UTM JB
Johor Malaysia**

Abstract: Intensive work was done with the use of dielectric resonators in both microwave circuits and antenna design applications through the past decades. The desirable properties of dielectric resonators such as their low cost, temperatures stability, high radiation efficiency as well as the small size due to their high dielectric constant made them advisable for microwave integrated circuits technology, mobile communications and antenna designs. High quality factor (Q) dielectric resonators have been used in the design of active or passive microwave circuits such as microwave filters and stabilized oscillators. On the other hand, such dielectric resonators have also found applications as radiating elements of low radiating Q factor while they were placed on finite ground plane in an open space environment. The radiation Q factor can be as low as ten or even lower.

Recently, the increased demand to minimize the antenna size is rapidly growing with downsizing the transceiver system module and that was mainly the goal behind the new studies done to investigate the use of dielectric resonators as a multi-function device. To maintain both compactness and miniaturization, high dielectric resonators were designed for different use simultaneously. To show this concept an example of having high-Q resonator and low-Q radiator simultaneously using single dielectric resonator working for oscillation and radiation purposes, respectively will be presented. The concept of having a dual band miniaturized antenna for both GPS as a circularly polarized antenna and wireless communication system applications as an omni-directional antenna will be presented. From the dual functions design to the triple functions design with the use of a single dielectric resonator, design challenges and intensions are considered. A triple mode operation for a dual band radiator of dual modes and a filter for the lower of the two bands using single resonator will be presented. Another recent applications will be presented if the time allows.

As a final conclusion, it has been proven that dielectric resonators can be of great benefit in the design of multiple function devices. That can definitely be of great benefits to the current demands in both microwave and communication systems, which are mainly looking for, "Design Compactness and Miniaturization".

About the Speaker:



Ahmed A. Kishk received the BS degree in Electronic and Communication Engineering from Cairo University, Cairo, Egypt, in 1977, and in Applied Mathematics from Ain-Shams University, Cairo, Egypt, in 1980. In 1981, he joined the Department of Electrical Engineering, University of Manitoba, Winnipeg, Canada, where he obtained his M.Eng and PhD degrees in 1983 and 1986, respectively.

From 1977 to 1981, he was a research assistant and an instructor at the Faculty of Engineering, Cairo University. From 1981 to 1985, he was a research assistant at the Department of Electrical Engineering, University of Manitoba. From December 1985 to August 1986, he was a research associate fellow at the same department. In 1986, he joined the Department of Electrical Engineering, University of Mississippi, as an Assistant Professor. He was on sabbatical leave at Chalmers University of Technology, Sweden during the 1994-1995 academic years. He is now a Professor at the University of Mississippi (since 1995). He was an Associate Editor of *Antennas & Propagation Magazine* from 1990 to 1993. He is now an Editor of *Antennas & Propagation Magazine*. He was a Co-editor of the special issue, "Advances in the Application of the Method of Moments to Electromagnetic Scattering Problems," in the *ACES Journal*. He was also an editor of the *ACES Journal* during 1997. He was an Editor-in-Chief of the *ACES Journal* from 1998 to 2001. He was the chair of Physics and Engineering division of the *Mississippi Academy of Science* (2001-2002). He was a guest Editor of the special issue on artificial magnetic conductors, soft/hard surfaces, and other complex surfaces, on the *IEEE Transactions on Antennas and Propagation*, January 2005.

His research interest includes the areas of design of millimeter frequency antennas, feeds for parabolic reflectors, dielectric resonator antennas, microstrip antennas, EBG, artificial magnetic conductors, soft and hard surfaces, phased array antennas, and computer aided design for antennas. He has published over 200-refereed Journal articles and 27 book chapters. He is a coauthor of the *Microwave Horns and Feeds* book (London, UK, IEE, 1994; New York: IEEE, 1994) and a coauthor of chapter 2 on *Handbook of Microstrip Antennas* (Peter Peregrinus Limited, United Kingdom, Ed. J. R. James and P. S. Hall, Ch. 2, 1989). Dr. Kishk received the **1995 and 2006 outstanding paper awards** for papers published in the *Applied Computational Electromagnetic Society Journal*. He received the **1997 Outstanding Engineering Educator Award** from Memphis section of the IEEE. He received the **Outstanding Engineering Faculty Member of the Year on 1998 and 2009**, **Faculty research award for outstanding performance in research on 2001 and 2005**. He received the **Award of Distinguished Technical Communication** for the entry of IEEE Antennas and Propagation Magazine, 2001. He also received **The Valued Contribution Award** for outstanding Invited Presentation, "EM Modeling of Surfaces with STOP or GO Characteristics – Artificial Magnetic Conductors and Soft and Hard Surfaces" from the Applied Computational Electromagnetic Society. He received the **Microwave Theory and Techniques Society Microwave Prize 2004**. Dr. Kishk is a **Fellow** member of IEEE since 1998 and Fellow of Electromagnetic Academy. He is a member of Antennas and Propagation Society, Microwave Theory and Techniques, Sigma Xi society, U.S. National Committee of International Union of Radio Science (URSI) Commission B, Phi Kappa Phi Society, Electromagnetic Compatibility, and Applied Computational Electromagnetics Society.

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