香港城市大學 City University of Hong Kong

Department of Electronic Engineering

毫米波國家重點實驗室 State Key Laboratory of Millimeter Waves
(香港城市大學夥伴實驗室) (Partner Laboratory in City University of Hong Kong)

IEEE (HK) Section AP/MTT

Seminar on

Application of Common Sense to the Study of Modern Wireless Systems

by

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Abstract

The objective of this presentation is to illustrate that new generation of systems are being proposed because the designers have failed to produce the results claimed in their position papers of the predesigns. This has been going on for decades and yet the electrical engineering community particularly the electromagnetic community is slow to grasp the fundamentals of the design flaw and continue their wild dreams without introducing reality checks. Some of the examples presented will be related to the following topics:

1. What happened to SDMA in communication systems after several decades? Why it can never be implemented in a system!
2. In prehistoric times one could listen to the other side of the world using a TRANSISTOR RADIO which cost a few dollars and now with the modern expensive phones you cannot even listen to the next room sometimes! What is the problem in the design and what are the flaws?
3. Which antenna radiates receives more signal: an electrically small antenna, a resonant length antenna or a very very short antenna used in the transistor at broadcast band?
4. What is MIMO and what is it good for?
5. Is the use of multiple antennas better than using a single antenna in any system?
6. What determines the characteristics of transmission: The Shannon Channel capacity or the speed of the velocity of light ala Maxwell?

The bottom line is that electrical engineering is vector in nature and this fundamental concept is missed in most studies of electromagnetics: the result is a bunch of expensive systems which do not fulfil their design goals. The question then is what to do and how to correct the flaws?

Biography

Tapan K. Sarkar received the B.Tech. degree from the Indian Institute of Technology, Kharagpur, in 1969, the M.Sc.E. degree from the University of New Brunswick, Fredericton, NB, Canada, in 1971, and the M.S. and Ph.D. degrees from Syracuse University, Syracuse, NY, in 1975. From 1975 to 1976, he was with the TACO Division of the General Instruments Corporation. He was with the Rochester Institute of Technology, Rochester, NY, from 1976 to 1985. He was a Research Fellow at the Gordon McKay Laboratory, Harvard University, Cambridge, MA, from 1977 to 1978. He is now a Professor in the Department of Electrical and Computer Engineering, Syracuse University. His current research interests deal with numerical solutions of operator equations arising in electromagnetics and signal processing with application to system design. He obtained one of the "best solution" awards in May 1977 at the Rome Air Development Center (RADC) Spectral Estimation Workshop. He received the Best Paper Award of the IEEE Transactions on Electromagnetic Compatibility in 1979 and in the 1997 National Radar Conference. He has authored or coauthored more than 300 journal articles and numerous conference papers and 32 chapters in books and fifteen books, including his most recent ones, Iterative and Self Adaptive Finite-Elements in Electromagnetic Modeling (Boston, MA: Artech House, 1998), Wavelet Applications in Electromagnetics and Signal Processing (Boston, MA: Artech House, 2002), Smart Antennas (IEEE Press and John Wiley & Sons, 2003), History of Wireless (IEEE Press and John Wiley & Sons, 2005), and Physics of Multiantenna Systems and Broadband Adaptive Processing (John Wiley & Sons, 2007), Parallel Solution of Integral Equation-Based EM Problems in the Frequency Domain (IEEE Press and John Wiley & Sons, 2009), Time and Frequency Domain Solutions of EM Problems Using Integral Equations and a Hybrid Methodology (IEEE Press and John Wiley & Sons, 2010), and Higher Order Basis Based Integral equation Solver (HOBBIES) (John Wiley & Sons 2012) .

Dr. Sarkar is a Registered Professional Engineer in the State of New York. He received the College of Engineering Research Award in 1996 and the Chancellor's Citation for Excellence in Research in 1998 at Syracuse University. He was an Associate Editor for feature articles of the IEEE Antennas and Propagation Society Newsletter (1986-1988), Associate Editor for the IEEE Transactions on Electromagnetic Compatibility (1986-1989), Chairman of the Inter-commission Working Group of International URSI on Time Domain Metrology (1990–1996), distinguished lecturer for the Antennas and Propagation Society from (2000-2003,2011-2013), Member of Antennas and Propagation Society ADCOM (2004-2007), on the board of directors of ACES (2000-2006), vice president of the Applied Computational Electromagnetics Society (ACES), a member of the IEEE Electromagnetics Award board (2004-2007), an associate editor for the IEEE Transactions on Antennas and Propagation (2004-2010) and on the editorial board of Digital Signal Processing – A Review Journal (2003-2012). He is on the editorial board of Journal of Electromagnetic Waves and Applications and Microwave and Optical Technology Letters. He is the chair of the International Conference Technical Committee of IEEE Microwave Theory and Techniques Society # 1 on Field Theory and Guided Waves. He is a member of Sigma Xi and International Union of Radio Science Commissions A and B. He is the 2014 President of the IEEE Antennas and Propagation Society. According to Google Scholar, he has a H-index of 55 with 13,485 citations to his work. He is also the president of OHRN Enterprises, Inc., a small business incorporated in New York state (1985) performing various research work for various organizations in system analysis. He received Docteur Honoris Causa from Universite Blaise Pascal, Clermont Ferrand, France in 1998, from Politechnic University of Madrid, Madrid, Spain in 2004, and from Aalto University, Helsinki, Finland in 2012. He received the medal of the friend of the city of Clermont Ferrand, France, in 2000.

Date : 19 March, 2015 (Thursday)
Time : 11:00 am – 12:30 pm
Venue : Room 15-202, 15/F, meeting room of State Key Laboratory of Millimeter Waves, 15/F, Academic 3, City University of Hong Kong

***** ALL ARE WELCOME *****

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