**“Floquet modal based Analysis of Finite and Infinite Phased Array Antennas”**

## IEEE MTT/AP Orlando Chapter Meeting

**DATE/TIME: Friday, April 5th, 2013, 4:30-5:30 PM**

**SPEAKER:** Dr. Arun Bhattacharyya, Northrop Grumman Corporation

**ABSTRACT:**

In this talk we present the Floquet modal analysis procedure for analyzing periodic array structures. The talk begins with a discussion on the relevance of Floquet analysis with regard to a scanned beam array design. Effects of mutual coupling on the performance of an array are discussed in details. It is shown how Floquet analysis can be employed to analyze a finite array with arbitrary amplitude taper including mutual coupling effects. A step-by-step procedure for aperture design is presented next. Method of analysis for an “array of subarrays” is also discussed. Design examples of patch and horn arrays are presented. A methodology for analyzing multilayered array structures with different periodicities is presented and applications of such structures in phased array antennas are discussed. In particular, characteristic features of a patch array loaded with a multilayered meander line polarizer are shown.

**BIOGRAPHY:**

Arun K. Bhattacharyya received his B.Eng. degree in electronics and telecommunication engineering from Bengal Engineering College, University of Calcutta in 1980, and the M.Tech. and Ph.D. degrees from Indian Institute of Technology, Kharagpur, India, in 1982 and 1985, respectively.  
  
From November 1985 to April 1987, he was with the University of Manitoba, Canada, as a Postdoctoral Fellow in the electrical engineering department. From May 1987 to October 1987, he worked for Til-Tek Limited, Kemptville, Ontario, Canada as a senior antenna engineer. In October 1987, he joined the University of Saskatchewan, Canada as an assistant professor of electrical engineering department and then promoted to the associate professor rank in 1990. In July 1991 he joined Boeing Satellite Systems (formerly Hughes Space and Communications), Los Angeles as a senior staff engineer, and then promoted to scientist and senior scientist ranks in 1994 and 1998, respectively. Dr. Bhattacharyya became a Technical Fellow of Boeing in 2002. In September 2003 he joined Northrop Grumman Space Technology group as a staff scientist, senior grade. He became a Distinguished Engineer which is a very rare and honorable recognition in Northrop Grumman. He is the author of “Electromagnetic Fields in Multilayered Structures-Theory and Applications”, Artech House, Norwood, MA, 1994 and “Phased Array Antennas, Floquet Analysis, Synthesis, BFNs and Active Array Systems”, Hoboken, Wiley, 2006. He authored over 95 technical papers and has 15 issued patents. His technical interests include electromagnetics, printed antennas, multilayered structures, active phased arrays and modeling of microwave components and circuits.

Dr. Bhattacharyya became a Fellow of IEEE in 2002. He is a recipient of numerous awards including the 1996 Hughes Technical Excellence Award, 2002 Boeing Special Invention Award for his invention of High Efficiency horns, 2003 Boeing Satellite Systems Patent Awards and 2005 Tim Hannemann Annual Quality Award, Northrop Grumman Space Technology.

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| **LOCATION:** University of Central Florida  HCEC 101 | **Organizer: Justin Luther**  **(407)569-6898,** [jjluther@ieee.org](mailto:jjluther@ieee.org) |