

Illinois Institute of Technology, Electrical and Computer Engineering Department  
IEEE Antennas and Propagation & Microwave Theory and Techniques Societies

## **Design, Simulation, Fabrication and Testing of Flexible Bow-Tie Antennas**

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**School of Electrical, Computer and Energy Engineering  
Arizona State University**

**Thursday, August 7 at 5:00 PM**

Illinois Institute of Technology  
Department of Electrical and Computer Engineering  
Siegel Hall Auditorium  
3401 South Dearborn St.  
Chicago, IL 60616

Host: Prof. Thomas Wong, [twong@ece.iit.edu](mailto:twong@ece.iit.edu)

The presentation will focus on the design, fabrication, simulation and measurements of two different flexible bow-tie antennas: a conventional and a modified one with reduced metallization. The antennas are mounted on a flexible substrate, which is fabricated at the Flexible Display Center (FDC) of Arizona State University (ASU). The substrate is heat stabilized polyethylene naphthalate (PEN), which allows the antennas to be flexible. The antennas are fed by a microstrip-to-coplanar feed network balun.

The reduction of the metallization is based on the observation that the majority of the current density is confined towards the edges of the regular bow-tie antenna. Hence the center parts of the conventional bow-tie antennas are removed without compromising significantly its performance. The return losses and radiation patterns of the antennas are simulated with HFSS and the results are compared with measurements, for bow-tie elements on flat and curved surfaces. The impact of the curvature is also examined. The comparisons show that there is an excellent agreement between the simulations and measurements for both cases. Furthermore, the radiation performance of the modified bow-tie antenna is verified to be very close to those of the conventional bow-tie by simulations and measurements.

In addition to the radiation characteristics of the antennas, the effects of the feeding structure and the conductor losses on the radiation performance of the antennas will be discussed.

## BIOGRAPHY



**Constantine A. Balanis** (S'62 - M'68 - SM'74 - F'86 – LF'04) received the BSEE degree from Virginia Tech, Blacksburg, VA, in 1964, the MEE degree from the University of Virginia, Charlottesville, VA, in 1966, and the Ph.D. degree in Electrical Engineering from Ohio State University, Columbus, OH, in 1969. From 1964-1970 he was with NASA Langley Research Center, Hampton VA, and from 1970-1983 he was with the Department of Electrical Engineering, West Virginia University, Morgantown, WV. Since 1983 he has been with the School of Electrical, Computer and Energy Engineering, Arizona State University, Tempe, AZ, where he is Regents' Professor. His research interests are in computational electromagnetics, flexible antennas and high impedance surfaces, smart antennas, and multipath propagation. He received in 2004 a Honorary Doctorate from the Aristotle University of Thessaloniki, the 2012 Distinguished Achievement Award of the IEEE

Antennas and Propagation Society, the 2012 Distinguished Achievement Alumnus Award (College of Engineering, The Ohio State University), the 2005 Chen-To Tai Distinguished Educator Award of the IEEE Antennas and Propagation Society, the 2000 IEEE Millennium Award, the 1996 Graduate Mentor Award of Arizona State University, the 1992 Special Professionalism Award of the IEEE Phoenix Section, the 1989 Individual Achievement Award of the IEEE Region 6, and the 1987-1988 Graduate Teaching Excellence Award, School of Engineering, Arizona State University.

Dr. Balanis is a Life Fellow of the IEEE. He has served as Associate Editor of the **IEEE Transactions on Antennas and Propagation** (1974-1977) and the **IEEE Transactions on Geoscience and Remote Sensing** (1981-1984); as Editor of the **Newsletter** for the IEEE Geoscience and Remote Sensing Society (1982-1983); as Second Vice-President (1984) and member of the Administrative Committee (1984-85) of the IEEE Geoscience and Remote Sensing Society; and Distinguished Lecturer (2003-2005), Chair of the Distinguished Lecturer Program (1988-1991), member of the AdCom (1992-95, 1997-1999) and Chair of the Awards and Fellows Committee (2009-2011) all of the IEEE Antennas and Propagation Society. He is the author of **Antenna Theory: Analysis and Design** (Wiley, 2005, 1997, 1982), **Advanced Engineering Electromagnetics** (Wiley, 2012, 1989) and **Introduction to Smart Antennas** (Morgan and Claypool, 2007), and editor of **Modern Antenna Handbook** (Wiley, 2008) and for the Morgan & Claypool Publishers, series on *Antennas and Propagation* series, and series on *Computational Electromagnetics*.

Please note: A light reception will be offered at 4:30 PM  
Visitor parking is available on campus  
Parking Lot D1 at the corner of State and 31<sup>st</sup> Street is open for free parking at 5:00 PM.