Challenges in Small Antenna Design
Will Metamaterials Provide the Magic Bullets?

時間：**2007年11月5日星期一下午1430~1700**

地點：國立高雄海洋科技大學多功能會議室(致遠樓五樓)

時　　間	項　　目	主　　講　　人
1430~1500	準　備　及　就　座	
1500~1630	**Challenges in Small Antenna Design---Will Metamaterials Provide the Magic Bullets?**	**Prof. Raj Mittra** **EMC Lab, PSU, USA** **RM Associates, USA** **Life Fellow, IEEE**
1630~1700	**Q&A**	

主辦單位：國立高雄海洋科技大學海洋工程學院

協辦單位：工研院資通所射頻通訊系統技術部
中山大學卓越研究小組(無線網路與多媒體中心)
正修科大射頻通訊技術研發中心
臺灣天線工程師學會(IAET)
IEEE AP-S Tainan Chapter

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Abstract

Small antennas have obviously become ubiquitous, as they can be found in so many electronic devices, including mobile phones, GPS units, laptops, sensors, and health monitors, just to name a few. Unfortunately, for antenna designers, the placement of the antenna in a complex electronic system is often dictated by concerns that are not electromagnetic in nature, but are rather based on cosmetics considerations instead, or are determined by considerations of cost-effectiveness and availability of real estate that must also accommodate many other devices, such as cameras and MP3 players. What is interesting, of course, is that, as the available space for installing the antenna keeps shrinking, the demand for increasing functionality to be delivered by the antenna keeps increasing.

Given this backdrop, we raise the fundamental question: Can we continue to shrink the antenna size, without sacrificing its performance, perhaps by using exotic materials such as metamaterials, or by taking advantage of some new phenomena such as plasmonic resonance that would rescue us from the conundrum that we, the antenna designers, find ourselves in, while trying desperately to cope with ever-shrinking size and ever-increasing set of demands?

The purpose of this talk is to critically examine some the physics-based fundamental limitations that we cannot overcome, no matter what material we use to fill the available space. The talk will argue that we should always think positively about the new developments, and proceed to examine the new-found possibility of using metamaterials with an open mind. We must, however, temper our enthusiasm until we have convincingly demonstrated that the materials that show promise for enhancing the performance of small antennas are indeed physically realizable, and not just idealized entities that exist only in the "effective medium" world. Finally, the talk will provide some clues, and discusses strategies that help us push the antenna design to the limit, in search of the proverbial "holy grail" of small antennas.

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Prof. Raj Mittra
EMC Lab, Pennsylvania State University, USA
RM Associates, USA
Life Fellow, IEEE

Biography

Raj Mittra is Professor in the Electrical Engineering department of the Pennsylvania State University. He is also the Director of the Electromagnetic Communication Laboratory, which is affiliated with the Communication and Space Sciences Laboratory of the EE Department. Prior to joining Penn State he was a Professor in Electrical and Computer Engineering at the University of Illinois in Urbana Champaign. He is a Life Fellow of the IEEE, a Past-President of AP-S, and he has served as the Editor of the Transactions of the Antennas and Propagation Society. He won the Guggenheim Fellowship Award in 1965, the IEEE Centennial Medal in 1984, the IEEE Millennium medal in 2000, the IEEE/AP-S Distinguished Achievement Award in 2002, the AP-S Chen-To Tai Distinguished Educator Award in 2004 and the IEEE Electromagnetics Award in 2006. He has been a Visiting Professor at Oxford University, Oxford, England and at the Technical University of Denmark, Lyngby, Denmark. He has also served as the North American editor of the journal AE&U.

His professional interests include the areas of Communication Antenna Design, RF circuits, computational electromagnetics, electromagnetic modeling and simulation of electronic packages, EMC analysis, radar scattering, frequency selective surfaces, microwave and millimeter wave integrated circuits, and satellite antennas.

He has published over 900 journal and symposium papers and more than 40 books or book chapters on various topics related to electromagnetics, antennas, microwaves and electronic packaging. He also has three patents on communication antennas to his credit. He has supervised 85 Ph.D. theses, 89 M.S. theses, and has mentored more than 50 postdocs and Visiting scholars. He has directed, as well as lectured in, numerous short courses on Computational Electromagnetics, Electronic Packaging, Wireless antennas and Metamaterials, both nationally and internationally.

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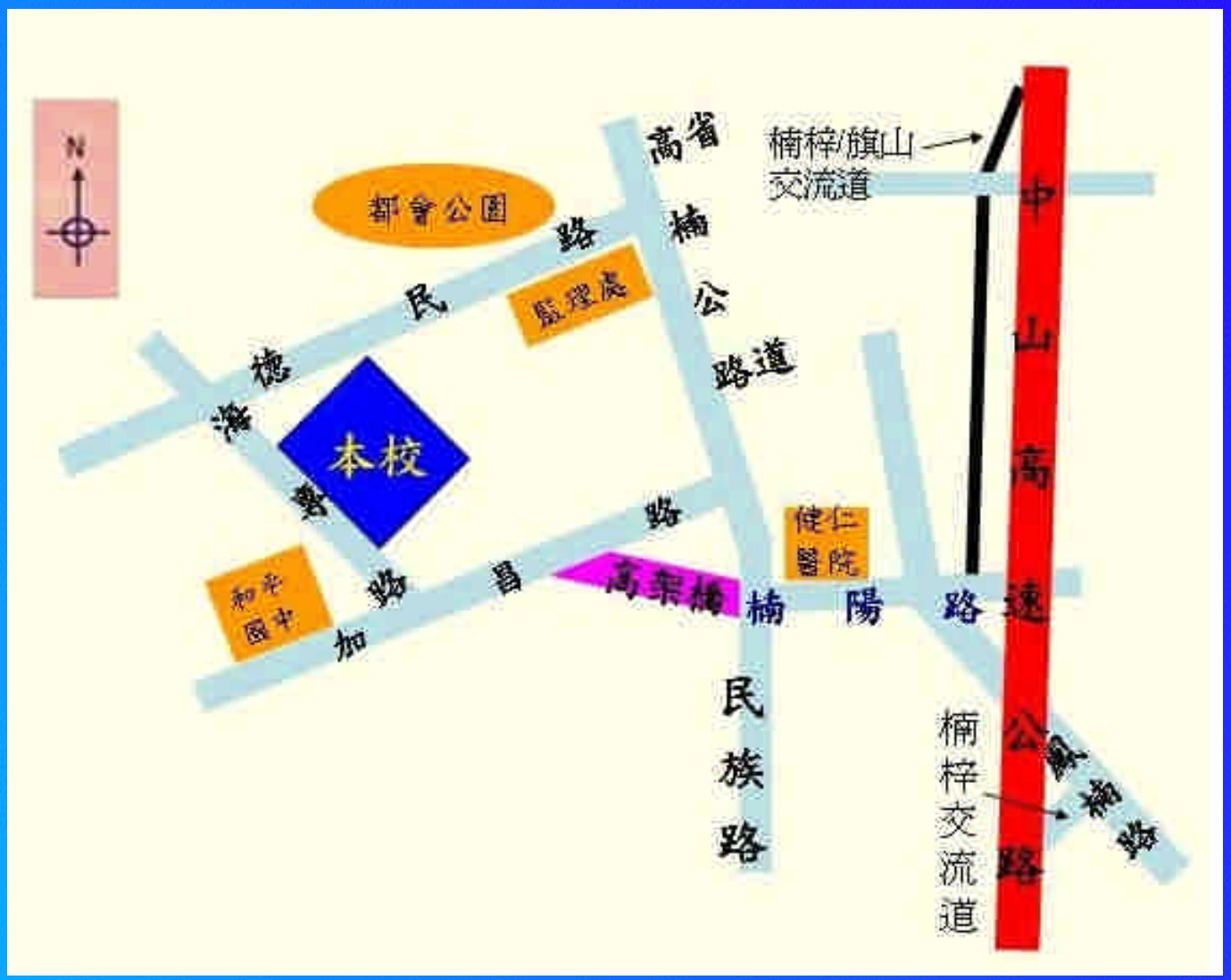

演講會場：國立高雄海洋科技大學致遠樓五樓多功能會議室